IRON & COAL TRADES REVIEW

JANUARY 15, 1960

Vol 180

No. 4,774

ESTABLISHED 1868

Incorporating "STEEL and IRON" and "COAL"

Organ of the National Association of Colliery Managers and the Association of Colliery Managers in India

Published each Friday

Annual Subscriptions United Kingdom....52s.
Abroad....60s. Payable in advance

Editor:
F. H. HARLEY

Mining Editor:
H. COOPER, A.M.I MIN.E.

News Editor:
P. E CARDEN

Associate Editors:
D. GRIMMER; R. M. HOWSE; B. M. DAVEY; G. L. WARD; C. J. COUPE

District Representatives:
ERIC PERRIN (North Eastern) Tel.: Whitley Bay 28018
A. D. H. CURRIE, (Northern) Tel.: Ringway 2452
E. J. SWEETING (Midlands) Tel.: Plumtree 2585
E. G. COLLIS (Southern Area) Tel.: TRAfalgar 6171
T. H. SMITH (Scotland) Tel.: Dumbarton 1046

Advertising Manager:
F. BARRINGTON HOOPER, B.A.

Production Manager:
R. J. LOVELL

Publisher: H. J. DWYER
Circulation Manager: E. T. GRIFFITHS

AN INDUSTRIAL NEWSPAPERS PUBLICATION

Published by
INDUSTRIAL NEWSPAPERS, LTD.

Directors:
BARRINGTON HOOPER, C.B.E., *Chairman and Joint Managing Director*
F. BARRINGTON HOOPER, B.A., *Joint Managing Director*
F. R. LEWIS
JOHN HOOPER
D. HORN
E. G. WESTON, *Secretary*

JOHN ADAM HOUSE, 17-19, JOHN ADAM STREET, ADELPHI, LONDON, W.C.2

Telephone: Trafalgar 6171 (Private Branch Exchange).
Telegraphic Address: "Zacatecas, Rand, London"

In this Issue—

GRANVILLE COLLIERY DEVELOPMENT
£1,500,000 Shropshire Reconstruction Scheme - page 121

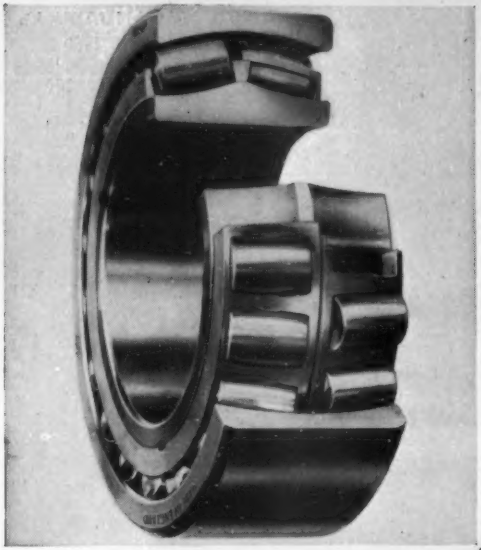
DURGAPUR'S FIRST BLAST FURNACE
Initial Stage in ISCON Steelworks Project - - page 127

DEPLOYMENT OF MANPOWER AT COLLIERIES
Operation of the Abergorki System - - - page 129

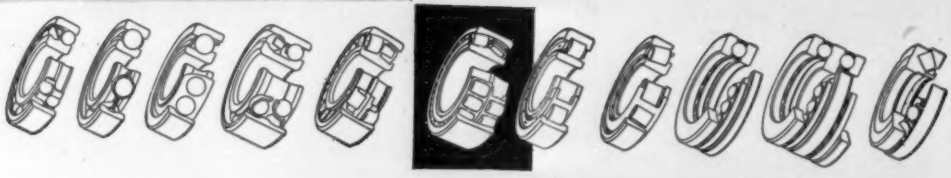
80-TON ELECTRIC FURNACE IN RUSSIA
Design and Operation Described - - - - page 137

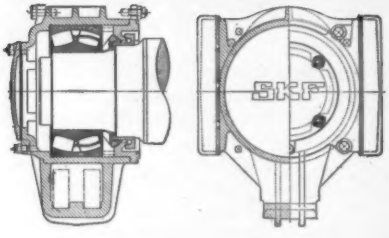
FRENCH METALLURGICAL SOCIETY
Papers Discussed at Autumn Meeting, 1959 - - page 140

	PAGE
Leading Article: Four Square Behind Coal	111
Difficult Year for Constructional Steel	112
United Steel's Training Facilities Supplemented	112
Record Output for West German Steel	112
Coal in the Past Year	113
Future of Sheet Steel	115
Steel in France and Germany	115
Passing Thoughts	116
Auchengeich Pit Disaster	117
National Coal Board's New Secretary	119
An "Alive, Prosperous, and Efficient" NCB Area	119
Non-ferrous Metals	120
Distribution of ECSC Loans	120
Expansion Visualized for Wm. Beardmore & Company	120
Strength of Rails	126
Bruce Peebles' Activities in 1959	128
Salt Water Corrosion of Mild-steel Tubes	128
Emergency Stop for Armoured Conveyor	136
Mineral Development in Kazakhstan	136
Forthcoming Events	136
Occupational Safety and Health Centre	139
New Equipment and Products	144
British Iron and Steel Industry Translation Service	146
Symposium on Welded Structure Fatigue	146
Future of the Open-hearth Furnace	147
Coalfield News	148
Proposed Merger of Reyrolle and Parsons	148
Coal Output is Contracting	149
North-East Mining Retirements	149
Personal	150
All-time Steel Record for December	150
The Coal Trade	151
Coal Chartering	151
Coal Stocks Position	151
Appointments	152
Iron and Steel Trade	153
South Wales Ports' Trade in 1959	153
Will Inflation Follow US Steel Strike Settlement?	154
Changing Pattern of Demand	154
Edgar Allen Feels Effects of Recession	154
AEI Steel Mill Equipment for Australia	154
African Notes	155
Europe Will Use and Stock More Coal	155
Economy Measures Affect Scotland's "Show" Colliery	156
Inquest on Brodsworth Mine Car Driver	156
Accident-free Durham Miner Can Go "Oop for t'Cup"	156
News in Brief	157
Engineers to Press Claims at Workshop Level	158
Company Statement: John Summers & Sons, Limited	159
Prof. Whetton to Lecture in Canada and the USA	161
Law Cases	161
Obituary	162
New Director for Geological Survey and Museum	162
Company News	164
Orders Placed	166
Board Changes	168



Only SKF can offer such a wide selection of British-made bearings





Axlebox for a diesel-electric locomotive

Since its introduction by SKF in 1920, the spherical roller bearing has come to be regarded as the pre-eminent type of bearing for carrying heavy loads. In addition, it is completely self-aligning — a feature which is only present to a limited extent, if at all, in other types of roller bearing.

This means that the *whole* load carrying capacity of SKF spherical roller bearings is available for carrying the load; none is wasted on local stress concentrations due to unavoidable inaccuracies in machining, or deflection under load of housings or shafts.

SKF has recently introduced an improved design of spherical roller bearing designated the C-type with a carrying capacity approximately 40% greater than bearings of the original design. Weight for weight and size for size SKF spherical roller bearings are the strongest in the world. That is why you will find them in applications where loads are heavy and bearing space restricted.

The spherical roller bearing in its various forms is one of the four basic bearing types, ball, cylindrical roller, taper roller and spherical roller manufactured in Great Britain by The Skefko Ball Bearing Company Ltd.

THE SKEFKO BALL BEARING COMPANY LIMITED · LUTON · BEDS

THE ONLY BRITISH MANUFACTURER OF ALL FOUR BASIC BEARING TYPES: BALL, CYLINDRICAL ROLLER, TAPER ROLLER AND SPHERICAL ROLLER

G176

IRON AND COAL
TRADES REVIEW

Vol. 180 January 15, 1960 No. 4,774

Four Square Behind Coal

ADDRESSING the monthly luncheon meeting of the Coal Industry Society last week, Mr. Will Paynter, general secretary of the National Union of Mineworkers, made it clear that the mineworkers' executive intends to keep a watchful eye on fuel policy, national and local, inasmuch as it affects the livelihood of those engaged in the coal industry. While not opposed to the burning of fuel oil by industry, the executive will firmly oppose its use to the extent that it damages the future prosperity of coal. It seems that adversity has brought a greater feeling of unanimity to the coal industry than ever before. It is a feeling to be fostered, for, with goodwill between management and men, coupled with earnest co-operation between the industry and the coal trade, coal will get on its feet far more quickly than is otherwise likely.

It is up to miner and management to see that coal comes to the market in the best state possible, and in quality and quantity to satisfy a demand that is steadily growing more critical. It is up to the merchant to see that delivery of the correct quality is made in the most attractive way and at the most convenient time. The fight is on, and it is the knowledge that the coal trade and industry are together in the fight that will prove the best stimulant to winning the battle.

Mr. Paynter's declaration that mineworkers will bring pressure to bear locally to prevent change-over to the use of fuel oil is a welcome one, as long as the " pressure " is in the form of persuasion and example. Other means of coercion can only bring retribution. To what extent are members of the industry and trade prepared to back up the use of coal and other solid fuels? When it comes down to individuals it is not so easy, with hand on heart, to declare complete allegiance. So varied are the types of home in which we live, and the needs of the families in them, that it is not feasible to expect all miners, coal merchants, and NCB officials to swear to use electricity, gas, or for that matter, fuel oil and paraffin, for heating their houses and hot water. Every fuel has its particular realm of usefulness. On the other hand, there is need for thought, where one's own livelihood may be at stake, when considering the purchase of some new heating appliance. Where solid fuel has an obvious claim—and it has in the great majority of circumstances—the miner, the management, and the coal merchant should without fail take great pains to see that the most efficient solid-fuel appliance to do the particular job is installed. Here, there is certainly a great need for the spread of information about modern solid-fuel appliances among the mining community. Even at high levels, the ignorance that exists about the efficient use of coal in suitable appliances is enough to shock the Coal Utilization Council.

There continue to be reports about miners selling, privately and illegally, their concessionary coal supplies, not only to the ruin of the coal merchant, but also to the great detriment of the industry. These actions have produced stern warnings from the National Coal Board, and it is to be hoped that the men in the industry will soon realize the harm they have been doing to their own cause. Some time ago the secretary of a colliery lodge in Wales stated that the busiest man in the Welsh mining valleys was the man selling paraffin. Indeed, it was said that miners were selling some of their concessionary coal supplies back to the NCB and buying paraffin with the proceeds. His lodge resolution calling on miners to take their full allocation of coal instead of burning oil was defeated.

Before turning on the miners for thus letting down the side, however, the coal trade must examine its own position. Most of the big merchants and many small ones have built up thriving fuel oil businesses. A great number of merchants also retail paraffin. No one can deny that it is good business to supply what is in demand. Nevertheless, it is vital to the future of the coal trade that the coal merchant should put his coal trade interests first, and make sure that he does not lose sight of the essential fact that coal is and will for a long time remain the basis of industrial and domestic heating in this country. It is indeed dangerous to look on the recent recession in the coal industry as more than a slight dent in the industrial graph of its history. Fuel experts are beginning to re-examine the estimates of fuel needs in the future, and of the means by which those needs will have to be provided. There is, for instance, a recognition in certain informed circles that there is a need to slow down the nuclear programme and, perhaps, spend some of the money projected for it on other fuel industries, not forgetting our own basic industry, coal. There is also recognition of the dangers of putting ourselves too much in the hands of oil-producing countries.

We do not suggest that the coal merchant and his staff as individuals should do their house and hot water heating and cooking by solid fuel alone,

any more than we should expect the management and men in the mines to do so. But there are many ways in which all those connected with the trade and industry could set examples. Miners selling concessionary coal privately are a disgrace to the mining industry. Equally disgraceful, in our eyes, is the coal merchant who does not, circumstances permitting, have a bright fire burning in a modern appliance in his order office. The same applies to his home. His home heating, as far as his solid fuel appliances are concerned, should be the envy of his neighbours. In local affairs, members of the industry and of the trade should always seek to persuade, with sound facts, all with whom they come in contact, of the advantages of solid fuel. They should be proud of its assets and make its advantages widely known. In these ways will the industry and trade best serve coal, backed up, of course, by efficient planning and operation on the part of the NCB.

Difficult Year for Constructional Steel

"MOST difficult trading year in the post-war period for the constructional steel industry," is the summing up of 1959 by Sir Ellis Hunter, chairman of Redpath Brown & Company, Limited, structural engineers and iron and steel stockholders, of Edinburgh, in his annual review. Order-books throughout the trade were seriously depleted, keen competition developed, and in spite of every effort made to increase the volume of work, total output from the company's four works at Edinburgh, Glasgow, Manchester, and London fell by 20 per cent. Profits dropped to £1,193,305 (£1,417,413).

Sir Ellis believes, however, that a more confident view of the future is possible, particularly in connection with the aluminium, oil, motor, and steel industries. The structural engineering industry generally and the company, in particular, was making every possible effort to improve the competitive position of steel against other forms of construction.

The increase in permissible loads on steel columns in buildings was one improvement secured and competitive power was likely to be further improved by the adoption of hollow casings of either vermiculite or asbestos. Research was being carried out in collaboration with one of the universities into the benefits to be derived from composite construction whereby greater advantage was taken of the stiffening effect of floor slabs of bridges and buildings.

Wellingborough Iron Company Relights Blast Furnace

INCREASING demand for pig-iron has necessitated the blowing-in of one of the two idle blast furnaces of the Wellingborough Iron Company, Limited, a subsidiary of Stewarts and Lloyds, Limited. The company, which already employs some 300 men, will need an extra 100 workers.

There are three blast furnaces at the company's works, but two of them have been idle since 1957 owing to reduced demand for pig-iron and a ban on overtime by the AEU. Weekly production is now expected to rise to 5,000 tons.

United Steel's Training Facilities Supplemented

SUPPLEMENTING the facilities in the Bessemer Memorial School of the Workington Iron & Steel Company, Limited (branch of the United Steel Companies, Limited), a new apprentice training workshop and dining and recreation rooms have been opened by Mr. R. Peddie, secretary of the United Steel Companies.

MR. R. PEDDIE

The new single storey workshop block reproduces training conditions which the apprentices will later experience when they transfer to the steelworks. It comprises a general workshop equipped with lathes, drilling, milling, grinding, polishing, shaping, and other machines, an electrical section, and a welding shop. Fifty-six apprentices are now being trained in the workshop under the tuition of full-time instructors. Linking the workshops block with the dining and recreation block is a full-sized squash court, with gallery and changing room.

The main contractor for the new buildings, John Twiname, Limited, has presented a silver cup to mark the completion of its first contract for Workington Iron & Steel. It will be known as the Twiname Cup and will be awarded annually for the best workshop performance by an apprentice during his first six months' basic training in the new shop.

Record Output for West German Steel

PROVISIONAL figures for the past year show that the Federal German iron and steel industry produced an all-time record of over 26,000,000 metric tons of raw steel, compared with 22,800,000 tons in 1958 and 24,500,000 tons in the last record year, 1957. If the steel production of the Saar, which during the year rejoined Germany, is added, the total exceeds 29,000,000 tons.

Between 18 and 20 per cent. of the country's steel output is exported and over the past year imports of rolled steel have increasd rapidly, coming not only from France, but also in quantity from Belgium and Luxembourg. Total rolled steel imports had by the last month of 1959 reached an average monthly rate of 200,000 tons, double that of the previous year.

Some DM 820,000,000 (£68,350,000) was invested in the national iron and steel industry in 1959, a fall from the previous year's total. Investments are expected to rise again, however, as from the second half of the current year.

THE PRIME MINISTER will be the principal guest and speaker at the annual dinner of the Institute of Metals at Grosvenor House, London, W.1, on March 31. The United States Ambassador will reply to the toast of "The Guests."

COAL IN THE PAST YEAR

NCB Chairman's Confidence in the Future

THOUGH coal is an old industry, compared with its rivals, the improvements in efficiency achieved during 1959, more rapid, despite the difficulties, than in any other year since nationalization, are evidence of its vigour and vitality. This was the keynote of a speech by Sir James Bowman, chairman of the National Coal Board, who with sober optimism and quiet confidence reviewed the industry's results for 1959 and outlined its prospects for 1960 at a Press conference in London on Wednesday.

Recapitulating the main headings of the board's "Revised Plan for Coal," Sir James said that it was based on the best estimates available (many of them forecasts supplied by the consuming industries themselves) of what demand would be and under it the industry would become more compact and better able to compete with other fuels. The board estimated total consumption this year at about 196,000,000 tons—slightly more than in 1959—and coke ovens and power stations expected to use more coal. Nevertheless, it was evident that output would have to be reduced below the 1959 level.

Open-cast production would come down by 4,000,000 tons to 7,000,000 tons—less than half the output that could have been produced and as open-cast was very profitable, the decision to cut output had been a difficult one to take. But there would have been serious social hardship to the mining community if it had been allowed to continue at the 1959 level—and it was obvious throughout Sir James's speech that the problem of hardship was never very far from his mind.

Buffer Stocks

Sir James began by outlining some of the difficulties that faced the board in 1959—the fall in demand, the world-wide growing surplus, and the fall in consumers' and pipeline stocks; its need to reduce output, mainly by closing 58 collieries (making a total of 90 in two years) and reducing the labour force by natural wastage; the cut in open-cast production and the building up of undistributed stocks. Against this he put the rapid advances in operational efficiency, productivity at record levels, and a 6 per cent. improvement in faceworkers' output per manshift and 5.3 per cent. overall—the biggest increases recorded for more than 30 years.

This improvement in productivity was largely responsible for a fall in production costs of about 1s. 9d. a ton, compared with 1958, although the burden of overheads was higher because of reduced outputs. "Progress of this kind means that when output is more nearly related to demand, the industry will be in a much stronger economic position," he said.

By putting coal to stock the board had been able to meet the first shock of the fall in demand, but it had been expensive. The last time the industry suffered a similar fall in demand was between 1929 and 1932. At the end of 1932, 350,000 miners were unemployed and almost all of those who remained in the industry were working short time. In contrast, because of the use of natural wastage to reduce the labour force and the buffer effect of stocking, there had been little redundancy this time.

The three years during which stocks had been increasing had been used to reduce output nearer to the level of demand. To have made the same reduction in one year would have been catastrophic in its effect on the mining community and large numbers of unemployed miners would have seriously affected the country's economy. "By spreading the necessary measures over three years the board has produced some coal before it is needed, but by doing so has been able to control the reduction in the industry's size and cope with the consequences."

The NCB chairman forecast another deficit for 1959 and emphasized that it was wholly accounted for by costs and provisions incurred through stocking, as was the case in 1958. During the first quarter of 1959 there was a surplus of £6,400,000, thereafter results deteriorated because of stocking of coal and coke.

Total deep-mined production in 1959 dropped to 195,270,000 (201,470,000) tons, or 3.1 per cent., open-cast production dropped to 10,830,000 (14,350,000) tons, or 24.5 per cent., the total decline for the year being 206,100,000 (215,820,000) tons, or 4.5 per cent. Overall output per manshift rose to 26.6 (25.3) cwt., an increase of 5.3 per cent. The number of men affected by the closure of collieries was about 17,000; by the end of the year only 1,300 under the age of 65 were still unplaced in jobs. Since the end of 1957 the labour force had been reduced by 70,000 to 640,000 at the end of 1959, almost entirely by normal wastage.

Inland coal consumption has dropped from 218,400,000 tons in 1956 to 190,500,000 tons last year. About 6,000,000 tons represented the effect of the Government's special programme to use oil for electricity generation, and temperature differences between the two years were estimated to have reduced demand by a similar amount. A further 6,000,000 tons represented the fall in demand due to recession and, although this was now largely past, there was a time-lag before there was an increase in the demand for coal and coke. The amount of business lost to oil, where it competed with coal other than in power stations, was about 7,500,000 tons; the remaining difference in consumption was due to increased efficiency of use.

Exports and foreign bunkers had dropped from 9,700,000 tons in 1956 to 4,300,000 tons in 1959 and competition continued to be intense, but the board looked to progressive increases in exports.

Referring to stocks, Sir James said it was often suggested that "undistributed" stocks were "unsaleable." In fact there was little difference in type or quality between this coal and that being sold at the rate of nearly 200,000,000 tons a year. There was no excess production of large coal and though a large part of the stocks consisted of untreated small coal it had a large and growing market. Suggestions were also made

that there should be "bargain sales" of coal stocks and Sir James pointed out that increased sales from stock would only bring corresponding reductions in sales from current production, resulting in further stocking and financial losses.

Of the number of man-days lost through strikes in British industry during the first 11 months of 1959 (5,152,000) 6.9 per cent. was accounted for by the mining industry. Between 1953 and 1958 coal mining accounted for between 6 and 29 per cent. of the total number of working days lost through strikes in the whole of British industry; in the five years immediately before the war the proportion ranged between 44 and 68 per cent.

On productivity, the NCB chairman said that the "Revised Plan for Coal" estimated overall output per manshift would reach 30 to 31 cwt. in 1965. Two NCB divisions—East Midlands and North-Eastern—had already reached this figure, last year's o.m.s. for East Midlands being 40 cwt. These divisions produced nearly half the board's deep-mined output and the effect on the NCB's average profitability was therefore considerable. "This is particularly encouraging since the plan requires them to play an increasingly large part in the future."

The increase in power-loading would have been much greater in 1959 had it not been necessary to restrict total output and to get as much large coal as possible. The use of substitutes, which yielded a greater proportion of large coal than conventional explosives gave, was being increased. The number of shots with alternatives increased from 1,700,000 (3 per cent. of the total) in the first nine months of 1957 to 3,400,000 (6.7 per cent. of the total) in the corresponding period of 1959.

Dealing with safety, Sir James said there were 348 (327) fatal accidents at all coal mines last year and 1,675 (1,752) serious non-fatal accidents. An experimental scheme to reduce accidents had produced encouraging results over the first 18 months of operation. During trials, accidents at the six collieries used fell by about 10 per cent. compared with the period immediately before the trials were started. It was aimed to extend the scheme.

Pointing out that the general level of inland coal prices had now been stable for two and a half years, Sir James said the board would try to ensure that this continued. If a further increase in efficiency such as that achieved during the last two years could be obtained and, provided external influences did not affect the finances, it was confident of its ability to hold its prices.

Technical and Sales Service

He went on to speak of the way in which the NCB was going all out to convince the public that coal, efficiently used, could meet all requirements economically and satisfactorily and promised that the technical and sales service offered would be backed with well-prepared coal, consistent in quality. By the end of the year 270 modern plants with a total cleaning capacity of 105,000,000 tons a year had been installed at a cost of about £50,000,000. Over 60 more plants with a further capacity of 45,000,000 tons a year were under construction or being planned. The increasing use of dense-medium plants would ensure maximum clearing efficiency.

Preparation facilities were also being used increasingly to help industrial consumers who found difficulty in using coal with a high content of "fines." More than 3,000,000 tons of fines were now being extracted in the dry state before the washery process. More than 30 centrifuges were installed in 1959 for the extraction of moisture from washed small coal and many more were planned for 1960, their use being extended to general steam-raising types.

For the purpose of earlier plans the industry's maximum attainable output was estimated at 240,000,000 tons. Under the revised plan production of between 200,000,000 and 215,000,000 tons in 1965 was provided for when about 80 per cent. of total output would be from new or reconstructed pits. During 1959 25 major colliery reconstruction schemes were substantially completed, making a total of 127 since the reconstruction programme began in 1947. The number of schemes for new and reconstructed collieries, etc., at the end of the year was 146.

Total capital expenditure in 1959 was about £108,000,000 and expenditure at collieries about £97,000,000; the 1960 figures would be rather less.

Reasons for Pit Closures

During 1960 it was planned to close about 46 collieries, most of which were reaching the end of their workable reserves. Only six would be closing because they were uneconomic or were producing low-quality coal. The reduction in output from these closures and those closures carried out in 1959 was estimated to be 4,000,000 to 5,000,000 tons. Deep-mined output would also be cut by 2,000,000 to 3,000,000 tons by special closure of faces or districts within collieries or by going on to single shift working. Overall it was hoped to restrict deep-mined output this year to 188,000,000 tons.

In most Areas recruitment, as in 1959, would again be confined to craftsmen and juveniles, but overall recruitment would be higher than last year. Wastage, however, would be greater as a result of universal retirement of men of 65 and over to take place this quarter. The net effect would be to reduce manpower from about 640,000 at present to about 595,000 at the end of the year. The reduction in 1959 was 47,000.

Sir James believed these measures would bring production down to a level below the expected rate of demand and he also expected that there would be no net addition to stocks and every effort would be made to reduce them.

In reply to a question, Sir James congratulated Mr. Will Paynter, general secretary of the NUM, on his recent speech in which he spoke of "jungle warfare" to persuade local authorities in coal-mining areas not to convert to oil. "I agree with him," he said. "I think they must be persuaded to see that they have a vested interest in the use of coal." If oil flowed into Britain to the extent that it affected the streamlining of the industry so that they could not compete with dumped oil, the board would have to close pits in which it had sunk vast resources and vast capital expenditure.

Up to now the board had not welcomed the idea of a tax on fuel oil, but he thought the situation might alter so drastically that he could not commit the board to definite policy on that. Germany was considering a 50 per cent. tax and Austria had already imposed one. If that led to the unloading on Britain of oil which would normally have been sold in Europe the NCB might have to change its policy. "We reserve our position and will study the situation as it develops," he said.

Cold weather should help to clear stocks to some extent in the next few months. Many consumers were at present very much understocked, but one of the difficulties was the apparent shortage of railway wagons and this had been delaying coal movements. The shortage, he understood, was caused by a lack of enough engine crews in British Railways, so slowing down freight train operations.

FUTURE OF SHEET STEEL

Possibility of Embarrassing Surplus

BALANCING the chances of a long-term surplus of sheet steel against the probability of, perhaps, an acute shortage in late 1961 and in 1962 appears to be behind the hesitance of the Iron and Steel Board in giving an immediate decision on the £33,000,000 scheme proposed by the Steel Company of Wales, Limited. The principal feature of the scheme would be to expand output of steel sheet and tinplate from the end of 1961. In some quarters it is believed that the acute shortage that may develop then may eventually turn into a surplus and an increasingly competitive situation in this section of the industry.

It is understood that the Iron and Steel Board has requested and received from SCOW further details on a number of aspects of the plan which was submitted for approval in its present form in the middle of last month. At least one other plan for sheet steel expansion, presumably presented by Colvilles, Limited, is also known to be under consideration by the board. This would be likely to envisage bringing the Ravenscraig strip mill into operation at an earlier date and perhaps with a higher initial capacity than at present.

The new strip mills—the Spencer Steelworks of Richard Thomas & Baldwins, Limited, at Llanwern (Mon) and the Ravenscraig development of Colvilles—were aimed to meet the target of 3,300,000 tons of sheet set by the board for 1962. The loan of an additional £10,000,000 to RTB was designed to expedite the first operating stage of the Llanwern mill and so help bridge the gap in 1962.

Water Supply Problem

An IRON AND COAL South Wales correspondent reports that what could prove a major problem for the new RTB mill is now causing some concern, particular to those responsibie for Newport's water supply. Because the starting date of the Spencer Works has been advanced the Newport Corporation has had to expedite its plans to supply the works with water. Legal and Governmental procedure, public inquiries, and statutory periods of notification may, however, provide frustrating delays.

The scheme, which is now in the planning stage, means the laying of 10 miles of 36-in. diameter pipe to carry water from the river Usk to fill the 100,000,000-gallon reservoir which is being constructed by RTB. Two pumping stations, a treatment plant, and two crossings of the Usk are involved.

Mr. A. E. Guild, Newport's waterworks engineer and manager, said: "They want the water by August, 1961, and that is not a very long time to get the scheme into operation. We are going to do everything in our power to comply with RTB's needs, but we have not hidden the difficulties from them. The parliamentary procedure before we can start work is complex.

"An Order has now been deposited, but a public inquiry will have to be held because of the size of the scheme," he said.

Steel in France and Germany

FRENCH steel output for 1959 reached 15,217,000 metric tons—an increase of 4 per cent. over 1958 and 8 per cent. over 1957, states the Steel Federation of France.

December output totalled almost 1,400,000 tons, a near-record and nearly 16 per cent. above the figure for December, 1958. The year's output of pig-iron, at 12,400,000 tons, was 3.6 per cent. up on 1958.

Fears that, with the ending of the US steel strike, French steel will be dumped on the German market, have been allayed to some extent by indications that domestic demand is still very strong and the low price of French steel which should continue to assure it a place on the US market. America is a more attractive proposition for French steelmakers as they are not limited to the prevailing home prices as they are within the ECSC.

A move to raise steel prices, which is certainly not discouraged by the High Authority of the ECSC, meets with little support from the French Ministry of Finance which seeks to hold prices at their present level—the lowest within the Community.

West Germany, too, shows small concern at the ending of the US steel strike as steel exports to America have now become firmly established, whatever the labour conditions. In the last quarter of 1959 exports of rolled steel products to the US made up only some 2 per cent. of West Germany's total output for the quarter. After a record sale of some 85,000 tons last February, German exports to America settled down to an average monthly rate of about 30,000 tons.

Raw steel production in Federal Germany in 1959 reached nearly 26,000,000 tons, compared with 22,800,000 tons in 1958. Pig-iron output rose by 1,830,000 tons to 18,490,000 tons. The December figures showed a decline compared with November. Steel output was down to 2,230,000 (2,930,000) tons and pig-iron to 1,670,000 (1,700,000) tons.

The West German concern, Luitpoldhütte, AG, has raised its annual pig-iron output capacity to 175,000 (115,000) tons by bringing into operation a new blast furnace. The furnace has been ready for use for about a year, but the company has waited for an improvement in market conditions. Since early in 1958 Luitpoldhütte's orders for pig-iron and hematite have been only 50 per cent. of the 1956 and 1957 levels.

Passing Thoughts . . .

A LOT of aluminum as well as aluminium has rolled out of the mills since the Reynolds Metals Company of Richmond, Virginia, and Tube Investments took over British Aluminium last January to form Reynolds-T.I. Aluminium. . . . Now the situation seems more peaceful, and acquaintances of Reynolds-T.I. Aluminium are receiving anniversary presents, golden aluminum (made in USA) cylinders, open at one end, containing silver-coated pencils. The exquisite, final public relations touch, which may well cause some old boys in the City to exchange I-told-you-so nods, is an imprint on the carton: "These pencils sanitized under germicidal ultra violet."—London Letter, in The Guardian.

We could all do with a bit more. The university professor can be just as concerned about his salary as a stevedore docker.—SIR WILFRED NEDEN, *formerly Chief Industrial Commissioner, Ministry of Labour and National Service.*

The [coal] industry is still burdened with far too many administrators and irresponsible decisions at colossal expense occur every year. Trade union leaders are out of touch with the rank and file. Far too much time is spent dabbling in politics.—Letter in the Stoke-on-Trent Evening Sentinel.

The miners' politically-biased leaders are responsible for the chaotic condition of the mining industry, due to its loss of markets to other sources of power, heat, and light. Neither the Labour Government nor the Tory Government are in the slightest degree to blame.—Letter in the Nottingham Guardian Journal.

If, as some say, a new industrial revolution is in progress, it has been made possible by the availability of indigenous fuel, and that fuel will be essential to its success in the decades ahead.—SIR JAMES BOWMAN, chairman of the NCB, in an article in The Guardian.

The competitive power of British coal in relation to other fuels is much greater than the events of the past two years would suggest. The curse of the coal industry is its inflexibility.—The Guardian.

Three times the electors have rejected nationalization; I trust that it has now been made clear that the doctrine has lost its appeal, and that the majority of voters want no more of it. I hope that the few remaining companies still in State ownership will soon be returned to private enterprise, and that ways and means will be found for disposing of the prior charges in all steel companies.—MR. RICHARD F. SUMMERS, chairman, in his statement circulated with the report and accounts of John Summers & Sons, Limited.

Our modest steelmasters have been buying huge full-page advertisements in all the newspapers to tell us how super-efficient they are. In particular, I read: "Britain's steel industry has done remarkably well since the war in having the right plant ready at the right time." I rubbed my eyes. What they don't tell us is that most of the new plant provided since the war has been made possible by State aid and finance.—MICHAEL FOOT, *in an article in the Daily Herald.*

Ideally, directors should be able to devote their undivided attention to the running of the business which has been entrusted to them and should not have to worry themselves every day about the market price of their shares or the identity of their shareholders. There may be occasions when something more drastic than a gentle kiss on the brow from a Prince Charming is needed to awaken the sleeping beauties. It may even be necessary sometimes to tip them right out of bed. But it can seldom be wise to pull down the whole house or even sell it as it stands to a stranger.—MR. ANTHONY TUKE, chairman of Barclays Bank, Limited, commenting on take-over bids.

When you hear people saying, "We are always having strikes," don't believe them. We are always saving strikes. All the time difficulties are being straightened out by intelligent relationships with the unions.—SIR JOHN ELLIOT, *former chairman of the Railway Executive and London Transport.*

The outlook is encouraging and hopeful, but the biggest fly in the ointment is the wildcat strike. The chief sufferer is the trade unionist mouse, who, through intimidation or apathy, does not attend his branch meetings.—SIR HAROLD BIBBY, chairman of Martins Bank, Limited.

Algebra is to be taught with wooden bricks at the works' school of Associated Electrical Industries (Manchester), Limited.—Report in The Guardian.

While it is patently absurd that open-cast mining should continue, wasting good land to produce coal that nobody wants to buy and, in the process, putting miners out of work, it seems to me equally absurd to pay out large sums of the taxpayer's money and get nothing in return. Is it not possible to arrange with the firms who have these contracts to accept in exchange contracts for making and improving roads?—Letter in The Scotsman.

Men who serve 50 years with one firm will become a select band of men less often seen in the future.—LORD DUDLEY GORDON, *chairman of Hadfields, Limited, Sheffield steelmakers, at the reunion dinner of the firm's Jubilee Staff Association, members of which have served over 50 years with Hadfields.*

I see politics in coal. If you had lived my life in the past few years you would have seen politics in coal.—SIR JAMES BOWMAN, chairman of the NCB.

What are the trade unions coming to? Do they actually want their members to have jobs? And regular weekly wages without strikes?—The Guardian.

AUSTRALIA'S LARGEST A.C. MINE WINDER

LARGEST a.c. winder so far commissioned in Australia and the first to be fitted with power-operated brakes has recently been installed at a mine near Newcastle, NSW, by Australian Electrical Industries Pty., Limited. The winder, driven by a 1,100 h.p. 570 r.p.m. 6,600-volt 50-cycle slipring induction motor, is designed to raise 300 tons of coal an hour from a depth of 720 ft.

Speed variation and direction of winding are governed by a liquid controller and an air-break reversing contactor. A single-reduction gearbox connects the motor to the winding drums, the maximum speed of which is 68 r.p.m.

In addition to the mechanical brakes, the driver has an electrical braking system which incorporates regenerative braking, reverse current braking, and dynamic braking.

Auchengeich Pit Disaster

TAMPERING WITH FIRE-FIGHTING EQUIPMENT

OPINION that most if not all of the 47 miners who died in the Auchengeich Colliery disaster on September 18 would have got out if they had been carrying self-rescue apparatus was expressed by Mr. William Kerr Dyer, superintendent of the Scottish Central Mines Rescue Station, Coatbridge. He was replying to questions put by Mr. Abe Moffat, president of the Scottish Area of the NUM, last Friday, on the fifth day of the Ministry of Power inquiry into the disaster which is being conducted by Mr. T. A. Rogers, HM Chief Inspector of Mines, acting as Commissioner for the Ministry.

It was explained that the apparatus had been tried out a year ago under the joint auspices of the NCB and the NUM in a number of mines and had been rejected. Mr. Dyer later told Sir Andrew Bryan, who is appearing for the National Association of Colliery Managers and the British Association of Colliery Management, that he seriously considered something further should be done about the introduction of some such apparatus.

Earlier the colliery safety officer, Mr. Robert Harvey (47), told the inquiry that he was seriously considering leaving the industry because of the frustration of his job. He was sick of it, he said. It was impossible because of tampering by an irresponsible minority of miners, even since the disaster, to keep effective fire-fighting equipment down the pit. (Other witnesses earlier in the hearing had given evidence of finding fire-fighting equipment ineffective or damaged.)

Could Not Get Desired Co-operation

Mr. Harvey said that 30 extinguishers had been set off since the accident, about 26 down the pit and four on the surface. "Only last week one of them was pulled off the wall of the baths," he added. He agreed with Mr. J. O. M. Hunter, QC, who is representing the National Coal Board, that in spite of working through the colliery consultative committee he was not getting the desired co-operation.

He told Mr. Moffat that he had had no occasion to apprehend danger from the booster fan "or its driving force." Engineers and electricians who were called in submitted reports, which the management read, on such faults. He wanted to clear up things in connection with the disaster because he had "to live with this." He insisted he had never heard of continual reports about defects on the fan throughout September. He added: "The last man to hear of trouble is a policeman. There had been other cases of trouble in the pit and the men would not tell me. Things happen in that pit I cannot find out . . . because they know I will report to the manager." During an inspection in August he had found the extinguisher nearest to the fan almost empty. It would have been impossible for it to have been discharged by an accidental knock. One of the reasons for bringing hoses up from the pit to a pithead fire station was to protect them from thoughtless damage. It was impossible to maintain fire-fighting equipment in effective order down the mine.

In his evidence Mr. Dyer, who said he had been in the mine rescue service since 1944 and superintendent at Coatbridge since 1950, gave details of rescue operations. Both the first and second rescue teams had reported that conditions were very, very bad. They could not see each other's safety lights and had to grope their way along the wall, holding on to each other. Another attempt was made later in the day, but he decided that it was hopeless.

Mr. Moffat, who expressed his appreciation of the work done by the rescue teams, asked Mr. Dyer about lectures and guidance on what was to be done in the case of an outbreak. Mr. Dyer said the need for urgency was stressed in lectures and training. There was also the emergency organization set up at all collieries. He had seen conveyor belt fires at Cardowan and Machrihanish collieries and agreed that the first objective in fire operations was to save life.

Replying to Mr. Harald Leslie, QC, representing the National Association of Colliery Overmen, Deputies, and Shotfirers, Mr. Dyer said he was satisfied that the equipment used for such an emergency was the best and most up-to-date known to rescue services.

The one difficulty which had not been overcome was reaching a mine in conditions of snow, frosty roads, or dense fog. No apparatus was allowed to be kept at collieries, even if there could be men standing by and near at hand. The difficulty was appreciated, but there was no set drill in the event of anything like this happening. He agreed with Sir Andrew Bryan that the use of fireproof belting would overcome many of the fire hazards.

At the inquiry the day before (Thursday) Mr. Robert Boyd (46), the day shift overman, said that when he went down the pit he was told the assistant overman had gone to investigate a smoke haze. He (the witness) went to switch off the high-tension circuits as a precaution and then passed an order to the haulage man that no more miners were to go "down the brae." He reached the fire, 1,000 ft. underground, in the booster fan house about a mile from the pit bottom and found "an inferno" beyond the fan house. He telephoned to the surface for hoses and the rescue brigade and later had again telephoned about hoses when he learned for the first time that 48 men were trapped in the return airway. "I was thunderstruck and shocked," he said.

In reply to Mr. Moffat, Mr. Boyd said he did not consider the position of the men when he went to switch off the high-tension circuits. He had assumed they would be hauled back up the return airway of the pit where they would be near an airlock. He would not accept that the position of the men had been forgotten "except perhaps momentarily."

One of the haulage men was detailed to attend to the fan and report if anything went wrong, he told

Mr. Moffat. The regulations stipulated a half-hourly inspection, but this was not strictly observed. A new belt had been fitted on the Wednesday before the disaster. Earlier that month the night shift engineer had told him that the belt had been torn at a buckle. The day before the fire the electrician had had to repair a broken contact in the switch.

Again questioned by Mr. Moffat, Mr. Boyd said there was always someone looking at the fan. If he was in he looked at it. He thought they were adequate safety precautions.

Mr. Moffat: "Do you honestly believe that a man engaged in that haulage engine room can give adequate attention to this fan?"—"Is it for me to say? There is an engineer down the pit and there is a man appointed for the job. It has been going on for years."

"Splendid Courage and Alertness"

Oncost worker, Mr. Thomas Halpin (21), described the rescue of Mr. Gordon Brown and Mr. Thomas Green and earned from Mr. Moffat the remark: "I do not want to ask this young man any more questions. I think we should express our deep appreciation of his splendid courage and alertness." He also paid tribute to Mr. Brown, who had sent three men up in a cage to the pithead and when he had got the cage back to the pit bottom for a fourth man, had fallen unconscious.

Mr. David Andrew Kirkpatrick, who is 72 and the oldest of the witnesses, described how he organized the fire-fighting equipment at the pithead after getting "a quiet hint" that something was wrong. "I visualized the whole area in No. 6 and I knew there was no hydrant and no hose there," he said.

The booster fan was again prominent in evidence when the inquiry resumed on Monday. Mr. David McKinnon (49), who has been at Auchengeich 21 years, 13 as chief electrical and mechanical engineer, told Mr. Moffat that he would be shocked if he heard that the fan was using a gallon of oil a week. If that amount had been used it must have been overflowing. It would run out on the bearing, but not necessarily on to the blades of the fan. He agreed it would be wise and in the interests of safety to have a sealing device which would protect the fan from "this kind of thing."

Mr. Leonard Cheesbrough, District Inspector of Mines, gave details of being informed of the fire. There was one hose in operation when he got down the pit and he would have liked to have seen more pressure on it. He agreed with Mr. Moffat that only fireproof belting should be used underground and he also agreed that there should be a fire station underground.

After the inquiry into the Creswell mining disaster in 1950 a recommendation had been made that mine belting should be fireproof. He thought it was a question of supply that it had not been used at Auchengeich.

Asked about self-rescue apparatus, Mr. Cheesbrough said: "Some years ago I was in close touch with trials carried out at a colliery in this coalfield where for a certain period the men carried this self-rescue apparatus underground. I was satisfied that this apparatus would be effective in a case of emergency. I would like to have seen the trials become fact."

Answering Mr. Hunter, Mr. Cheesbrough said that at the moment no fire-resistant belting which would answer the requirements for a fan of the type at Auchengeich was on the market. About deposits of oil in the vicinity of the fan he said there never had been any excessive deposits of oil.

Mr. Thomas McAulay, who was in charge of the fire-fighting arrangements at the pithead in September, said that there was no emergency plan to put into operation in the event of fire. He was replying to Mr. Moffat, who also asked: "Is there any special code signal by telephone in the event of fire breaking out at the colliery?"—"Not that I know of."

On the day of the disaster an electrician asked him about 7.5 a.m. for a fire extinguisher. He was told the fan was blazing and he estimated that he got extinguishers and other equipment to the low scaffold by 7.30 a.m. He believed that the fire-fighting equipment was adequate for all the demands made upon it from underground. When asked if he was captain of the fire-fighting team, Mr. McAulay said: "I cannot be in charge of fire-fighting arrangements underground when I am not allowed underground."

Mr. Alexander Pettigrew (64), undermanager at the colliery, said on Tuesday that when he went to the fire he had no suspicion that there were men in the return airway. When he saw the men at the pit bottom he assumed they were all back. The day-shift haulage engineman was given instructions to attend to the fan, oil it, and report if anything went wrong with it. On the afternoon shift the overman instructed a man to look after the fan and on the night shift a man who looked after the pumps attended to it.

He agreed with Mr. Moffat that it was "rather serious" that no fire-fighting was taking place at 7.30 a.m. Asked if he considered it right that no hoses should be kept down the pit, he said: "It is better that they should be kept down there," but he added: "If hoses were kept down the pit the brass pieces were cut off and, I presume, sold for scrap. That is why the hoses were kept on the surface."

Mr. Moffat: "It takes a disaster of this kind to convince you that this is wrong?"—"If whoever is doing this was to refrain from it I would say the best place is underground."

Mr. Moffat: "Do you consider it right to penalize and jeopardize a whole pitful of men through the action of one or two people?"—"I know it is not right."

In reply to Mr. Leslie, Mr. Pettigrew said that since the disaster 30 extinguishers had been tampered with.

Use of Balata Belting

Mr. William Gordon Williams (39), HM Mechanical Inspector of Mines for Scotland, agreed with Mr. Moffat that if the area between the front of the fan and the safety fence had been fireproofed this would have gone a long way towards preventing the fire. Oil and coal dust had played a part in spreading the fire.

Asked about the use underground of balata belting (woven cotton fabric treated with balata gum) Mr. Williams said: "I don't think we should use balata belt on an underground fan unless we have an attendant there." He considered it should not be used in the mines if fire-resistant belting was available—and he understood it would be shortly.

When a balata belt was stopped and remained in contact with the driving pulley it could catch fire very easily, but even that fire could be put out if there was someone to attend to it.

Replying further to Mr. Moffat, Mr. Williams said that as the fan was a comparatively small one, running at its maximum speed, a new set of blades should have been fitted after eight years. If a blade was missing the general condition of the machine was starting to deteriorate, and if four blades were missing the balance of the fan would be upset to some extent, producing belt slip and deterioration.

Earlier evidence had caused him to conclude that the amount of oil used on the bearings of the fan was

excessive and tests carried out on pieces of the belt indicated that it was below standard in respect of adhesion and ply separation.

Principal witness on Wednesday was the colliery manager, Mr. James Ford Smellie (45), who explained why he did not summon the mines rescue brigade to the pit until 35 minutes after he had learned there was a fire underground. Mr. Smellie said he was told there was a fire in the fan house at 7.5 a.m. He knew there was something seriously wrong at 7.20 but did not call the central rescue brigade until 7.40. Men were underground at the fire and he did not think it wrong to wait because he did the sensible and essential thing which was to "lift the needles" (remove a safety device so that the pit cage could descend—a job taking up to 20 minutes).

Cross-examined by Mr. Moffat, Mr. Smellie said there was no point in having the rescue brigades come to the pit and then have to wait to go down.

Mr. Smellie cleared up the mysterious bell signals heard coming from the haulage way hours after the men had been trapped there and feared dead. A rescue team, opening up a cross cut to investigate, he said, established that roof falls had probably "tripped the signals." Later it was discovered that this was the case.

Deputy Area production manager (operations) of the Central West Area, Scottish Divisional Coal Board, Mr. James Lawrie (47), was asked by Mr. Moffat about the state of the fan belt where the fire originated and which had been causing trouble before the disaster. While Mr. Lawrie could give no opinion about the belt in question, he said: "If a belt was in a bad or poor condition I would not run it."

NATIONAL COAL BOARD'S NEW SECRETARY

SECRETARY of the National Coal Board in succession to Mr. C. A. Roberts, whose appointment as a member of the board was announced recently, is to be Mr. Robert George Collin Cowe, deputy secretary of the board since October 1, 1958.

Born on September 24, 1917, Mr. Cowe was educated at Duke's School, Alnwick (Northumberland), Berwick-on-Tweed Grammar School, and Edinburgh University. He served in the Army throughout the war and was commissioned in the Royal Artillery. After service in North Africa and Italy he was demobilized with the rank of major and appointed to the Indian Civil Service. Constitutional changes in India prevented the appointment being effective and, after a temporary appointment in the office of the Ministry of Labour's Regional Appointments Officer in Leeds, he joined the Coal Board in February, 1947.

Mr. Cowe was in the chairman's office until February, 1952, for the last three years of this time as personal assistant to first, Lord Hyndley and, later, Sir Hubert Houldsworth. His next appointment was as secretary of the East Midlands Divisional Coal Board and in August, 1955, he became staff director of the North-Eastern Divisional Coal Board.

MR. JOHN CARTER has been appointed technical representative of Sintered Products, Limited, Sutton-in-Ashfield (Notts), a member of the Sheepbridge Engineering, Limited, group, for the area covering Leicestershire, Derbyshire, Nottinghamshire, Yorkshire, Northumberland, and Co. Durham. His home address is 66, Burlington Road, Sherwood, Nottingham.

An "Alive, Prosperous, and Efficient" NCB Area

"THE mining industry is not down and out. In Nottingham—in No. 6 Area in particular—it is alive and prosperous and efficient," said Mr. N. R. Smith, Area general manager of No. 6 Area, East Midlands Divisional Coal Board, speaking at a joint meeting of the Area's colliery consultative committees, at Bestwood on Monday. The meeting was called to discuss the problems and difficulties facing the industry in general and No. 6 Area in particular.

MR. N. R. SMITH

Outlining the NCB's "Revised Plan for Coal," Mr. Smith said that there seemed to be a feeling of alarm and despondency in the coal industry at the moment, but he was convinced that it had a future and was far from finished. In the East Midlands Division they were expected to produce 44 000 000 tons of coal in 1960 and between 47,000,000 and 49,000,000 tons a year by 1965. Out of 1960's production, 20,000,000 tons would go to power stations. The new High Marnham power station would use about 9,000 tons daily—the total output of collieries such as Bestwood and Carlton combined.

By 1965, Mr. Smith said, several collieries on the west side of north Derbyshire would be closed through exhaustion of resources, but these would be replaced by new pits like Carlton, Bevercotes, and Cotgrave. In August, 1959, 100,000 men were employed in the division and by 1965 the number would be between 98.000 and 102.000.

Two assurances he gave were that ground stocks would not be increased during 1960 and that as there was lack of work in No. 6 Area no one was likely to work himself out of a job.

Mr. Albert Martin, secretary of the Nottinghamshire Area of the NUM, emphasizing that there was a future in coal, said: "It is fantastic to say that an industry that is asked to produce 200.000,000 tons of coal a year is doomed. We are fortunate; the industry is to be compressed into a small area and the focal point of that area is Nottinghamshire."

Recent Wills

MORGAN, B. J., of Tydfil (Glam), retired coal merchant £34,263

OXLEY, L. B., retired machine-tool designer, of Shipley (Yorks) £9,589

BROWN, W. S., late of the Spensall Screw & Bolt Company, Leeds £2,922

WILLIAMSON, MATTHEW, of Distington, Workington (Cumberland), retired coke-oven worker £5,442

JENKINS, E. P., late a director of Robert Jenkins & Company, Limited, engineers, galvanizers, etc., of Rotherham £31,915

FIRTH, G. T., head of Richard Firth & Sons, Limited, woollen and worsted machinery manufacturers and exporters, of Cleckheaton (Yorks) £6,732

BARKER, S. N., chairman of Bardic, Limited, manufacturers of aluminium die castings, of Northam, Southampton, and formerly managing director of the British Power Boat Company, Limited, Hythe (Kent) £14,659

Non-ferrous Metals

Problems Facing US Copper Industry

ALTHOUGH the settlement of the US steel industry dispute imparted a firm tone to non-ferrous metal markets on both sides of the Atlantic, it may well make a complete settlement of the problems confronting the US copper industry more difficult. This is because it is believed that the steelmen received a great deal more by way of a wage rise than have the members of the Mine, Mill and Smelter Workers' Union who have already concluded agreements with copper companies.

The present position is that only Kennecott of the big producers has come to terms with the union; even that is incomplete, as the company's big Utah property is still strikebound. Nothing has been heard from Phelps Dodge and it is now announced that Anaconda has broken off negotiations with the union. Hence, a great deal of US copper production capacity is still tied up and this means that there will be a shortage of physical copper for some months ahead, even if there is a settlement immediately.

This is the main reason why London price levels have held up so well. The outlook is good; demand is steady to strong and prices should go higher. The US price structure is unchanged, with custom smelters quoting 35 cents and producers 33 cents a pound. An interesting news item is that electric power has now begun to flow from the Kariba Dam to the copper companies on the Northern Rhodesian Copperbelt.

Tin was the metal which benefited most from the settlement of the eight-month old steel dispute in the US. This is because the US steel industry absorbs about 30,000 tons of tin per annum in the production of tinplate. The immediate reaction in London was a rise in the price of both cash and three months' metal. Three months' metal has advanced well and the backwardation has now closed up to about 30s. a ton and may well disappear shortly. The outlook is good, although the recent estimate of a surplus of production over consumption this year by approximately 14,000 tons has engendered a note of caution into the markets. More than that, if this "guesstimate" is near the mark it may well put the International Tin Council in the embarrassing position of having to cut back export quotas before the end of the year. US consumer interest is fast reviving and the quotation has advanced to around $1.00 a pound.

Zinc, which has been a good market on both sides of the Atlantic for some time, continues firm. US experts predict a shortage in the months ahead of galvanized hot-rolled and cold-rolled sheet steel. This statement, read in conjunction with a continuing buoyant car market, gives a bright outlook for zinc. In any event, special high-grade electrolytic is now quoted at 14¼-14¾ cents a pound and zinc. East St. Louis, at 13 cents a pound, compared with 12½ cents a pound previously. The only other item of interest is that the United Nations study group will meet in Geneva on January 27 to discuss the world position of zinc and of lead.

Lead is an improving market in London and in New York, where the price is firmer at 12 cents a pound.

Official metal prices in London yesterday (Thursday) were:—COPPER, Standard: Prompt £255 10s., forward £245 10s. TIN, Standard: Prompt £790 10s., forward £788. LEAD: Prompt £74 15s., forward £74 17s. 6d. ZINC: Prompt £94 15s., forward £92 5s.

Distribution of ECSC Loans

DETAILS have been given of the use to which almost $200,000,000 of loan funds has been put by the High Authority of the European Coal and Steel Community. Nearly 70 per cent. went to the coal-mining industry for pit power-station projects, modernization of old collieries, sinking of new shafts, pit consolidation, and coking plants. Over 10 per cent. went to the iron-ore mining industry, principally for the exploitation of new sites. The steel industry's share was 21 per cent., going almost wholly to pig-iron production in the ore-preparation and blast-furnace stages.

The distribution was roughly in the following percentages:—Federal Germany (including the Saar), 61.5; France, 18; Italy, 13, and Belgium/Luxembourg, 7½ per cent.

The emphasis, generally, is on electrical power from coal. While hard coal output between 1952 and 1958 rose by about 3 per cent., output from coal-burning power stations almost doubled. For the future coal-mining capacity is expected to rise by another 6 per cent., but coal-burning power station output by 50 per cent.

In the Community's iron-ore industry investment rose sharply in 1956 and production capacity over the 1952-58 period increased by 33 per cent. It is expected to rise by a further 12 per cent. by 1962.

Figures for the iron and steel industry indicate that in the 1952-58 period production of furnace coke rose by 25 per cent., sinter by 61 per cent., pig-iron by 26 per cent., raw steel by 39 per cent., and rolled steel by 39 per cent. In the period 1958-62 it is expected that capacities will have risen by 15, 73, 21, 15, and 13 per cent., respectively.

For the current year total Community investments in the various industries, with 1959 figures in parentheses, are estimated as follow:—Hard coal, $376,000,000 ($509,000,000); brown coal, briquettes, and combustion coke, $4,000,000 ($6,000,000); iron ore, $32,000,000 ($44,000,00), and iron and steel, $327,000,000 ($585,000,000).

Expansion Visualized for Wm. Beardmore & Company

PROPOSALS for expanding capacity, both at the Sheffield steelworks of Thos. Firth & John Brown, Limited, and at the Glasgow works of its subsidiary, William Beardmore & Company, Limited, are under consideration, states Sir John Green, chairman of both the parent and subsidiary companies. The proposals include the possibility of putting down new mills, but no firm decision has been made, he said. "We are ploughing back a huge amount of money and it is taking the form particularly at Beardmore's of trying to adapt a huge works to the changing pattern of demand."

Sir John said that armour plating was no longer required and there had been a severe contraction in the demand for heavy forgings. "But," he added, "we have put down a very big modern electric plant at Beardmore's—one of the largest in the world—and we have to find an outlet for its production. We are also examining the possibility of putting down a cogging mill at Beardmore's and we have introduced at the Parkhead Works a branch of business not hitherto carried out there."

GRANVILLE COLLIERY DEVELOPMENT

£1,500,000 Reconstruction Scheme in Shropshire

GRANVILLE COLLIERY, near Oakengates, Shropshire, is an example of what can be achieved by the reconstruction on modern lines of an old and comparatively small colliery for a relatively modest capital outlay. Established about a century ago, the colliery can now be expected to work for at least another 60 years as a successful modern, economic undertaking. The reconstruction scheme drawn up in 1954 by the National Coal Board, and now largely completed, made provision for a modern surface layout, including new pithead baths and administrative buildings, and an improved ventilation system.

It remains to build up output by extension of underground workings and with additional men. But the project is already fulfilling the purpose for which it was intended by yielding increased output and providing much higher efficiency, at the same time providing greatly improved working conditions underground.

Even while reconstruction was being carried out over the last two years the colliery made a growing contribution to the improved efficiency and to the financial results obtained by the small Shropshire coalfield—which has only two other collieries.

Output Potential

When the colliery was taken over by the National Coal Board in 1947, it was producing about 500 tons of coal a day. The overall o.m.s. was 21 cwt. It is now producing at the rate of around 900 ton/day, with an overall o.m.s. of nearly 29 cwt. That is an increase of 80 per cent. in output and of 38 per cent. in o.m.s. This growth in output and productivity is shown in Table 1.

The scheme provides for a daily output capacity of 1,200 tons, or 288,000 tons a year, for which a total labour force of 775 would be required. Of these, 307 would be employed at the coal face. On full capacity the colliery will be able to produce at the rate of 90 cwt./manshift at the coalface, and 35 cwt. overall.

The reconstruction scheme also makes provision, if necessary, for future expansion of output. Workable coal reserves available to the colliery are ample: they are estimated at 88,000,000 tons. Of these, the present development is designed to extract 17,000.000 tons. giving working facilities—with an output of 288,000 tons a year—for 60 years. Further development can be undertaken to exploit additional coal at any time.

TABLE 1.—*Operational Results at Granville Colliery from 1953 (Pre-Reconstruction Year) through the Reconstruction Period.*

Year.	Tonnage.	o.m.s.		Manpower (average).			
		Face.	Over-all.	Face.	Others.	Sur-face.	Total.
1953 ..	135,554	74.7	22.2	178	222	154	554
1954 ..	152,356	77.6	23.7	197	243	125	565
1955 ..	132,247	75.2	19.6	200	252	124	578
1956 ..	98,774	77.7	15.5	143	284	139	566
1957 ..	134,352	82.5	19.5	150	309	151	610
1958 ..	206,753	87.9	28.9	223	269	157	649
1959 .. (half-year)	108,937	83.9	28.6	251	284	160	695

1956 Output curtailed and manpower transferred from coal production to reconstruction and development.
1957 Battery locomotives and mine cars installed in November.
1958 Full year with improved facilities and additional men at the coal face.
1959 Considerable geological difficulties were experienced during this half year.

The total cost of reconstruction of the colliery, including preliminary work, is £1,517,000, of which £1,077,000 represents new capital.

With the plant and equipment necessary to handle the output and sufficient face room now available to enable the designated tonnage to be produced, the scheme is substantially completed. To produce the planned tonnage, rather more than 100 extra men will be required, at least 60 of whom are needed at the coal face. These requirements are shown in Table 2.

TABLE 2.—*Manpower Position at Granville Colliery.*

	Scheme requirements.	Average, Jan./June, 1959.	At July, 1959.
At the coal face ..	307	251	245
Elsewhere underground	269	284	276
Surface	199	160	149
Total	775	695	670

Extensive Reserves

Grange and Granville collieries, situated halfway between Wellington and Newport and a mile north of the Watling Street, and half a mile apart, were owned before nationalization by the Lilleshall Coal & Iron Company. Their shafts were sunk about 1860. Because the proved coal reserves accessible to the two pits were limited, the company put down two boreholes to the north-east of Granville about 1938. These indicated a substantial extension of the coalfield in that direction. They proved eight workable seams lying between 1,500 and 1,900 ft. from the surface (Fig. 1). They were identified as continuations of seams known during previous mining.

Quality varied but some of the seams were excellent and capable of providing high-grade domestic and industrial fuels.

In consequence, it was decided in 1943 to develop Granville. They began to make some improvements at the colliery and continued to do so until the board took over the collieries in 1947. When the board took over, it decided that although the boreholes already put down were useful and encouraging, more knowledge of the field should be obtained before deciding how Granville could best be developed. Accordingly further borings were put down to prove the extent of the coalfield to the north-east.

Information yielded by this further exploration, together with that provided by the Lilleshall Coal & Iron Company's earlier borings, proved the field and indicated the best way in which it could be developed.

Decision to Reconstruct

Detailed plans were prepared and the divisional board proceeded with the reorganization of Granville Colliery. In 1952, Grange Colliery had reached the end of its life as a production pit and it was closed. But development of Granville Colliery required considerably improved ventilation facilities. The 1,200-ft. deep shafts were only 10 ft. in dia. With one, the upcast and the other the down-cast shaft ventilation was only sufficient for limited operations.

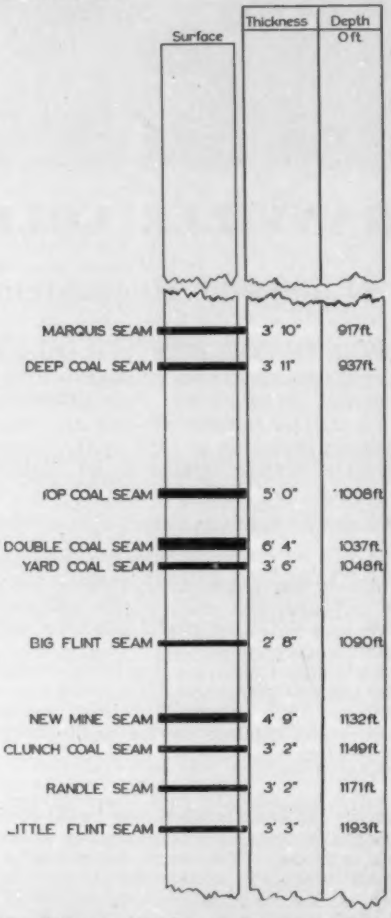


FIG. 1.—WORKABLE SEAMS AT GRANVILLE COLLIERY.

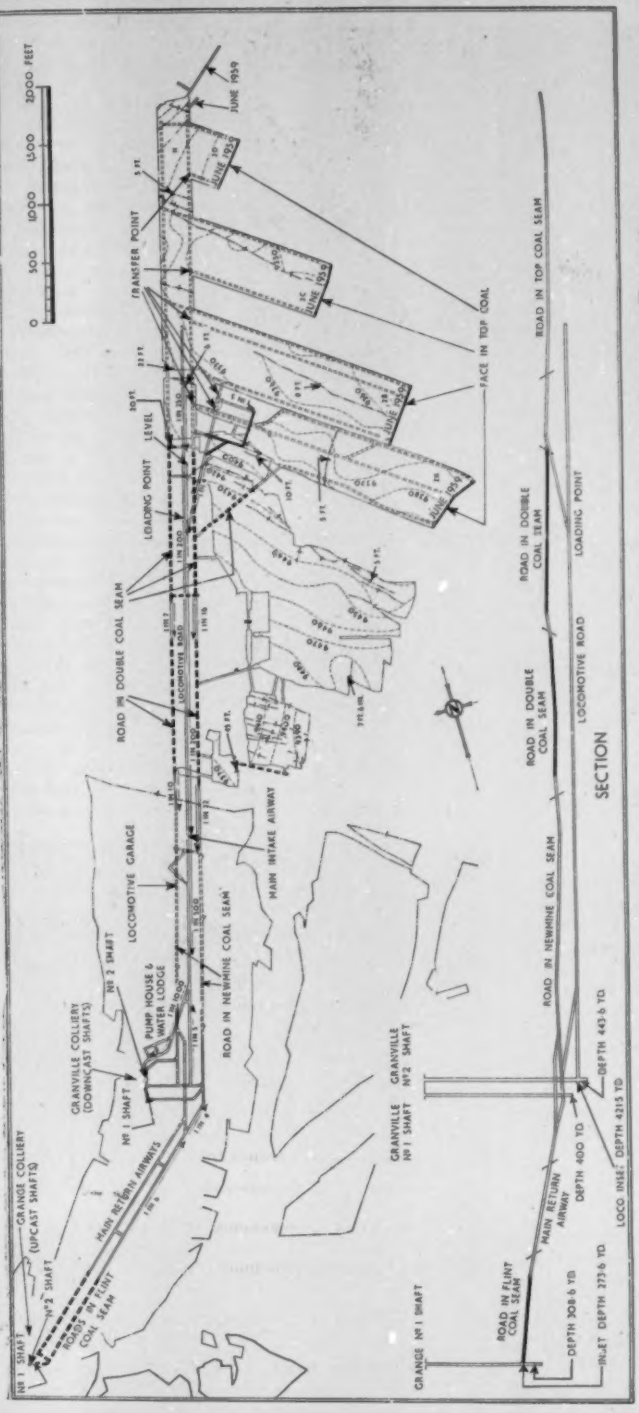


FIG. 2.—PLAN OF UNDERGROUND WORKINGS INDICATING THE VENTILATION SYSTEM AND THE METHOD OF TRANSPORT.

The planning of the scheme indicated that although the 924-ft. deep shafts at Grange were each only 8 ft. in dia., they could be used in the ventilation system of Granville. By converting them into twin-upcast shafts, connecting them to the Granville workings by two tunnels 1,000 yd. in length, and by making both the Granville shafts downcast, a greatly improved ventilation system was thus provided at Granville.

Basis of Plan

Up to 1953, the improvements made at the colliery were mainly in the modernization of the surface plant and the mechanization of the coal face workings underground. The object of the reconstruction plan that has since been carried out was to make possible the full exploitation of the colliery's potentialities and to improve efficiency. The basis of the plan was a complete change in the method of hauling the coal from the working faces to the shaft bottom and winding it to the surface.

Hitherto, the coal had been transported in tubs of 1 ton capacity on an endless-rope haulage system in accordance with traditional practice. This was costly in manpower, and, under the arrangements obtaining at the colliery, not a reliable system. The shafts could only accommodate small cages carrying one tub on each of two decks, while the winding capacity was inadequate for the future of the colliery.

It was, therefore, decided to make the No. 2 shaft the main coal-winding shaft and to operate the colliery by a modified form of horizon mining. This entailed the provision of a big, level underground roadway for haulage and intake air, enlarging and adapting the existing haulage and return air roadways to form dual airways and connecting the existing workings to this road system by short, side tunnels or staple shafts. A plan of the underground workings, shown in Fig. 2, illustrates the ventilation system and the method of transport.

These proposals necessitated

FIG. 3.—PIT BOTTOM OF NO. 2 SHAFT (MAIN COAL-WINDING SHAFT) SHOWING THE PNEUMATICALLY CONTROLLED RAMS AND OTHER CONTROL GEAR.

the widening and deepening of the No. 2 shaft, provision of a new shaft bottom, and extensive roadway drivage and development. They also involved the substitution of 2½-ton mine cars for the 1-ton tubs and the introduction of battery locomotives to haul the mine cars. The scheme provided for the winding of the mine cars up the No. 2 shaft in single-deck cages (Fig. 3), with a compact, automatic surface system to deal with the cars on reaching the pit top.

Reserve Capacity

These plans were designed to give the colliery a capacity for future output of 1,800 ton/day, although the planned output on completion of the scheme was 1,200 ton/day (288,000 ton/yr.) with an increased labour force. The planned output represented more than double the production at the time of nationalization. Further increase in output would be dependent upon the needs for the coal, and additional manpower being obtained.

To efficiently carry out the major change to mine-car haulage and winding it was worth while sacrificing current performance for a short period so as to gain earlier benefits. A substantial number of men were, therefore, put on to reconstruction work for a time.

In consequence, the change to mine cars was effected in 1957—a year earlier than originally planned—with the resultant benefits of the more efficient haulage and winding system a year ahead of programme.

Now the whole scheme is substantially completed. No. 2 shaft has been widened from its former 10 ft. dia. to 16 ft. and deepened by 120 ft. The coal is being transported by a trunk-convevo. system from the coal faces through a 1 in 4 tunnel to a temporary loading point (Fig. 4), and thence by 2½-ton mine cars hauled by battery locomotives to the shaft along the new locomotive haulage road.

The locomotive haulage road, with a cross section of 16 to 17 ft. wide by 12 ft. high, supported by steel arches, has been driven below the old workings from No. 2 shaft bottom for a distance of over 2,000 yd. Work is proceeding to complete it to the planned length of 2,500 yd. to the point where a staple shaft is to connect with it. The staple shaft—connecting the coal workings to the road—will be equipped with a spiral chute which will feed direct into the mine cars at a permanent loading point. This arrangement will supersede the conveyor in the 1 in 4 tunnel now serving the temporary loading point.

In addition to the drivage of the new locomotive tunnel, the work accomplished includes the enlarging of the existing roadways in the seams, so that the old haulage road is now a part of the dual-return airway system. The ventilation air flowing through the mine has been increased by 60 per cent. This has made possible the ventilation of the additional coal faces developed to give increased output from the pit.

At the pit bottom, a new sub-station, water lodge and pump house have been constructed and the equipment has been installed. The underground

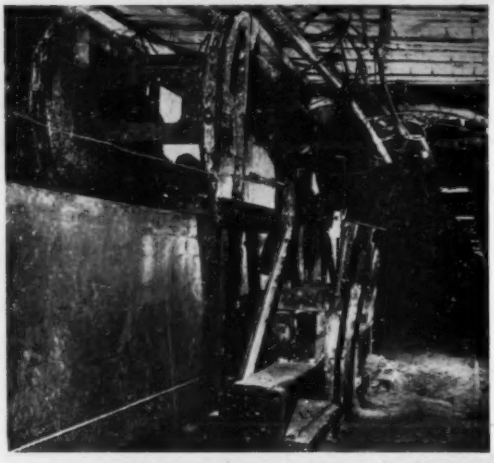


FIG. 4.—TEMPORARY LOADING POINT TO WHICH COAL FROM THE COAL FACE IS BROUGHT BY A CONVEYOR SYSTEM.

men who had previously walked to their work now ride the greater part of the distance by special man-riding cars.

Surface Facilities

Simultaneous with underground reconstruction further substantial improvements have been made on the surface. A new and compact circuit has been provided for handling the 2¼-ton mine cars at the top of No. 2 shaft. The circuit is pneumatically operated from a control desk (Fig. 5), and includes rams for car changing in the cages, two traversers and a tippler. The whole system is enclosed in a new heapstead building. Conveyors transport the coal to the coal preparation plant and the dirt to the spoil heap.

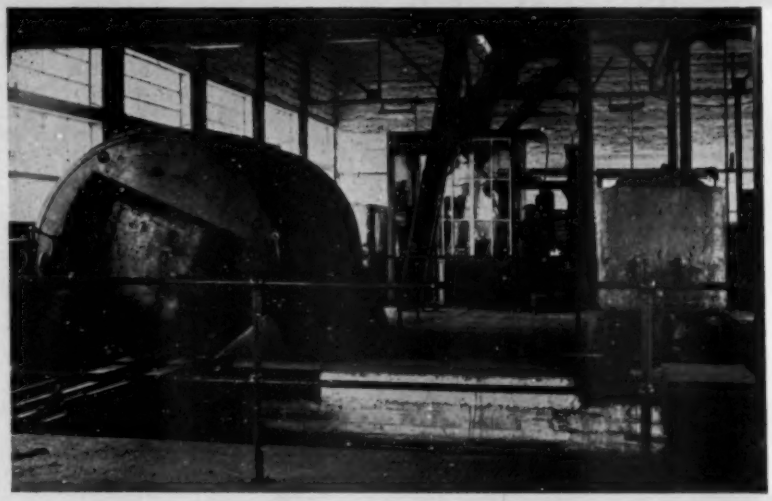


FIG. 5.—CONTROL DESK IN THE CAR HALL AT THE TOP OF NO. 2 SHAFT (THE MAIN COAL-WINDING SHAFT).

The coal preparation plant has been extended and modernized to bring its capacity up to the rest of the plant and to ensure that the product leaves the colliery properly cleaned and graded.

A new building for the lamp-room, with offices for the undermanager, deputies and time clerks, and incorporating a deployment centre, has been built. In addition, new managerial offices with a conference room in which meetings such as those of the colliery consultative committee are held, and with extra accommodation for the Shropshire group staff, were built and brought into use in 1958.

The remaining old buildings have been demolished. Roads have been made in the colliery yard, including car parks, and the whole has been finished with lawns and gardens.

A pithead baths installation with accommodation for 800 men, and provision for later extension to 1,000, was opened in December, 1955. The building includes a modern canteen, and the boilers, in addition to heating the water for the baths, provide space heating for all the surface buildings.

Outstanding Work

Outstanding work to complete the scheme underground includes, in addition to extension of the main locomotive tunnel, the construction of the vertical staple shaft to connect the workings in the Top Coal seam to the tunnel. Development of new coal faces, together with the training of face workers, is also being carried on with all possible speed in order to provide the means of reaching the 1,200 ton/day output at which the scheme aimed.

On the surface the main outstanding item is the installation of a second main ventilation fan. This will have a larger capacity than the existing one, which will then become the standby fan. The new fan is under construction by the manufacturers and is being installed.

New Catalogues, etc.

THE following new catalogues, booklets, etc., have been received and are acknowledged with thanks.

RANSOMES & RAPIER, LIMITED, Ipswich and London—Leaflet Nos. 1/526 and 5/464 illustrating various departments of the company and reviewing a number of its products, namely: fork trucks; walking draglines and stripping shovels, mobile cranes, etc.

K. S. PAUL (MOLYBDENUM DISULPHIDE), LIMITED, London, N.18—Booklet dealing with technical properties and application of molybdenum disulphide.

CHEMICAL CONSTRUCTION (GB), LIMITED, London, W.1—Brochure designed as a simplified medium to manufacturers for the selection of sulphuric acid plant.

CARTER GEARS, LIMITED, Bradford (Yorks)—Folder No. AL50/1, giving comprehensive details of the size AL50 Carter hydraulic variable speed gear.

MOND NICKEL COMPANY, LIMITED, London, S.W.1—Booklet dealing with the application, properties, and types of SG iron.

GEORGE KENT, LIMITED, Luton—Leaflet Nos. 265, AS1, and 1518 describing instruments for temperature measurement; details of the company's after-sales service including research, production and operation; and the Commader spare-parts list of the integrator (tractor-wheel type).

V.A.M. GROUP OF COMPANIES, Watford—Compact booklet No. 16 referring to universal asbestos cement, unilux plastics, union pitch fibre pipes, "Seel" insulations, complete with diagrams and tables.

Strength of Rails

TWO principal types of rail are used on British Railways, the bull-head section usually weighing 95 lb./yd. as rolled, and the flat-bottom section weighing 109 lb./yd. The bull-head (BH) rail has been used in more or less the same form for more than 50 years, but at present about 55 per cent. of the new rails each year are of the flat-bottom (FB) type.

A paper entitled "Strength of Rails with Particular Reference to Rail Joints" was presented by SIDNEY WISE, DONALD LINDSAY, and I. G. T. DUNCAN at a meeting of the Institution of Mechanical Engineers on Wednesday of this week. The following notes are taken from a supplied summary of the paper.

A study of the vertical bending strength of 95 lb./yd. BH rail has suggested that in conditions of general corrosion and gradual loss of head thickness by wear, the useful limit to rail life is set by the increasing probability of fatigue failure. Tables have therefore been constructed relating the permissible head wear of these rails to the various conditions of traffic.

In the case of FB rail the section is so stiff as to make the probability of fatigue failure in vertical bending minute even at the extreme practical limit of head wear. However, study of the rail-failure statistics compiled from each region of British Railways shows the most common type of failure to be one in which radial cracks develop from the fishbolt holes at the ends of the rails, and although the total number of such failures is small, there is some evidence that the flat-bottom section, owing to its thinner web, may be more prone to failure of this type than is the BH rail.

For this reason an extensive investigation has been made into the problem of radial cracking at fishbolt holes; the investigation has consisted principally of the field measurement of stresses in fishbolt holes under different types of traffic, and the determination of the fatigue strength of the rail ends in various conditions.

Field stress measurements have been made at two main-line sites carrying different traffic: the first site is predominantly steam worked with many fast passenger trains daily, while the second is in an electrified area, and carries both electric locomotives, and multiple-unit suburban trains. On both sites it was possible to obtain directly comparable figures from joints in both BH and FB rail and many thousands of records have now been obtained.

Fatigue testing of full-size rail specimens in the laboratory, done concurrently with the field experiments, has first determined the fatigue strength in vertical bending for both rail sections in the as-rolled and the corroded condition. The bulk of the work has, however, been done on drilled specimens loaded so as to produce radial bolt-hole cracking similar to that observed in service failures. A comparison between BH and FB rails has shown that their performance in this test is similar in terms of load sustained: *i.e.*, the increased section modulus of the FB rail is of no advantage in resisting cracking of this type.

Various methods of improving fatigue strength of drilled rails have been tried, and work hardening the surface of the bolt holes by "drifting" has been found to effect a 50 per cent. improvement, which is maintained almost unchanged after prolonged exposure to corrosion. Experiment with varying size of bolt hole has, however, shown a relatively small improvement in fatigue strength associated with the use of the smaller bolt hole favoured in France and in this respect the figures obtained by field measurements are not wholly confirmed.

The stress level in the bolt holes of ordinary corroded rail at loads equivalent to the fatigue limit has been determined and shows a small margin of safety under "normal" conditions of maintenance for FB rails carrying electric-locomotive hauled traffic at speeds up to 60 mile/hr.

£66,000,000 Steel Plan for Turkey

TURKEY'S first project for the production of flat rolled-steel products, including tinplate, is beginning to take shape. Located at Eregli, north-west of Ankara, the initial £66,000,000 installation is scheduled to begin production in 1963 at an annual rate of 268,000 metric tons of flat products. 110,000 tons of ingot output will be delivered to an older mill at Karabuk, which produces structural products. In its first stage, the plan will provide 50,000 tons of tinplate annually.

A letter of intent has been signed by the Turkish Government with three United States concerns for equipment and engineering services totalling about £51,000,000. The letter covers for the first of three stages of development which will eventually provide a yearly output of more than 1,000,000 tons. The company's concerned are the Koppers Company, Westinghouse Electric International Company and the Blaw-Knox Company.

Besides engineering and construction services, Koppers is supplying the blast furnaces, coke ovens, oxygen converters and various steelmaking facilities. Blaw-Knox will supply the mechanical apparatus for the major rolling mills and process lines. The integrated installation will include a combination two-high and four-high reversing mill with a speed of 3,000 ft./min.

Westinghouse will provide all electrical equipment, including main drives for the rolling mill, as well as a complete 20,000-kilowatt power plant.

Exchanging Information

Local industry, public libraries, and colleges of technology in the Huddersfield and Halifax area have formed the Huddersfield and District Information Scheme, the object being to make available to each member the combined resources of the books and periodicals of a commercial, scientific, and technical nature which are in the specialist libraries in the area by means of a system of interlending. Mr. L. Taylor, librarian of the Industries Gear Divisions of David Brown Industries, Limited, Park Works, Huddersfield, is the hon. secretary.

Durgapur's First Blast Furnace in Operation

INITIAL STAGE IN ISCON STEELWORKS PROJECT

FIRST blast furnace at the Durgapur Steelworks, West Bengal, was commissioned on December 29, 1959, by the President of India. Altogether, the plan for the integrated steelworks calls for three blast furnaces. The design, purchasing, and contracting of the iron-making plant was carried out by Head Wrightson Iron & Steel Works Engineering, Limited, a subsidiary of Head Wrightson & Company, Limited, member of the Indian Steelworks Construction Company, Limited.

Each of the three furnaces is capable of a daily production of 1,250 tons of pig iron, with an estimated average coke consumption of 2,000 lb./ton of iron and an average limestone consumption of 700 lb./ton of iron. Two of the furnaces will normally be engaged in the production of iron for use in the steelmaking plant, while the third furnace, when available, will produce foundry iron for internal consumption in the works foundry, or for sale.

Materials are charged into the furnace through a revolving distributor of the McKee-Head Wrightson type. The revolving receiving hopper is 6 ft. 6 in. dia., with three supporting rollers, hold-down rollers and side rollers, with a manganese steel bell seat.

Furnace Details

The distributor is driven by a 10-h.p. a.c. motor through a worm gearing, with selective reversing control and dynamic braking. The small bell is 7 ft. dia. (in halves), weighing approximately 5 tons, and the pneumatic bell hoist operated by the cold blast can in an emergency be controlled by the compressed air system for the plant.

The large bell is a steel casting 15 ft. 6 in. dia., with a 53 deg. side angle, weighing approximately 25 tons. The large bell hopper is a steel casting, with a 15 ft. 10 in. top diameter and a 14 ft. 9 in. dia. seat, weighing approximately 33 tons. Hopper capacity is approximately 1,700 cub. ft. Operation of both large and small bell hoists is similar.

All equipment is designed to enable the furnaces to be operated at a later date at a high top pressure of 10 lb./sq. in. Each furnace has a hearth diameter of 27 ft. with 18 tuyeres and an effective working volume of approximately 41,400 cub. ft. The furnace hearth, bosh, and inner wall are lined with firebrick blocks, with an additional carbon brick lining inside the hearth cooling staves.

One set of hematite-iron cooling plates inside the hearth jacket provides the cooling. Eleven rows of flat plate copper coolers are provided for the bosh and seven for the stack.

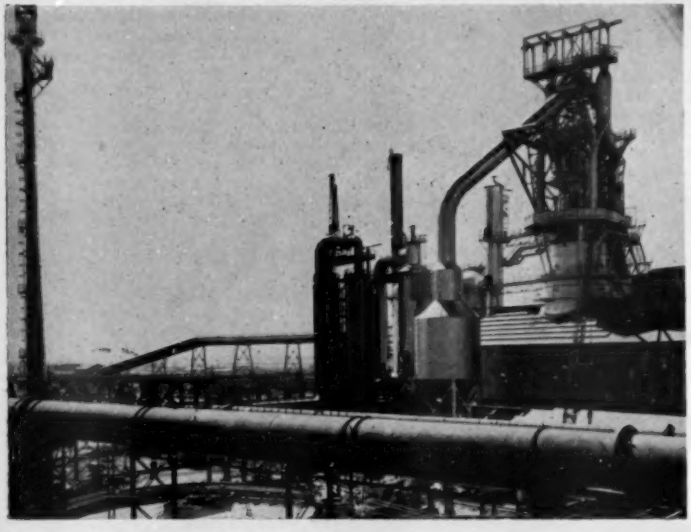


FIG. 1.—NO. 1 BLAST FURNACE READY FOR BLOWING IN AT THE DURGAPUR STEELWORKS. THIS FURNACE, TOGETHER WITH TWO OTHERS IN COURSE OF CONSTRUCTION, WAS MANUFACTURED IN THE THORNABY-ON-TEES WORKS OF HEAD WRIGHTSON AND SHIPPED TO INDIA FOR ERECTION. THE FURNACE IS DESIGNED TO PRODUCE 1,250 TONS OF IRON PER DAY.

Each furnace has three hot blast stoves with a total heating surface in each stove of approximately 229,000 sq. ft. Each stove is of the two-pass design with side combustion chambers of elliptical cross-section of 55 sq. ft. area; the stove shell is 26 ft. dia. by 110 ft. high.

Gas-cleaning Plant

The estimated total gas made from the three furnaces will be 18,000,000 cub. ft./hr. and the gas-cleaning plant is designed to clean this quantity to a maximum dust content of 0.004 grn./cub. ft.

After passing through the primary and secondary dust catchers of the two static tower gas washers, the washed gas from each of the three furnaces is then passed into an electrostatic fine cleaning plant common to all furnaces. This will consist of eight Head Wrightson Research Cottrell wet-tube electrical precipitators, each of 25 ft. dia.

Each precipitator is equipped with a selenium rectifier, a 35-kVA three-phase 50-cycle 400/75,000 volt transformer/rectifier, and a 35-kVA regulating transformer to maintain a pre-set value constant to within ±1 per cent. regardless of supply voltage fluctuations.

Pig-casting Plant

Hot metal from the blast furnace producing foundry iron and also surplus basic iron are transported by rail in ladles of 90-ton nominal capacity to the pig-casting plant.

The plant will consist of two double-strand pig-casting machines, with a rated capacity of 60 tons of pig per casting hour on each strand. Each strand is independently controlled and capable of speeds varying from 20 to 40 ft./min.

Bruce Peebles Activities in 1959

ORDERS for a wide range of equipment coupled with uncompleted orders carried forward from 1958 kept the works busy throughout 1959, states Bruce Peebles & Company, Limited, Edinburgh. During the year, a number of electrical generators were commissioned in North of Scotland Hydro-electric Board stations, including two 12 MW 11 kV horizontal synchronous machines at Shin, a 3,500-kW, 3.3 kV vertical slow speed alternator at Lairg, an 18-MW vertical generator at Orrin, and a 2,500-kW induction generator at Cuaich. Two 18-MW generators and one 12-MW generator for the Cwm Rheidol Hydro-electric project in Central Wales are under construction.

For industry, the company received at the beginning of the year an order for electrical plant for the Sendzimir steel strip mill being installed by Richard Thomas & Baldwins, Limited, in South Wales. This plant comprises a 3,720-kW four-machine generator set and direct-current motors totalling 3,930 b.h.p.

The electronics division continued to expand during the year and announced several new products. An agreement was made with Simon Carves, Limited, Stockport, for the joint design and supply of electronic-pneumatic and electronic-hydraulic control and locking equipment for mine car handling, skip winding plant and other mining applications. Together the two companies have devised a contactless control system which is thoroughly reliable under the most adverse, wet, humid or dusty conditions. This equipment has been ordered for several new collieries in Scotland.

Salt Water Corrosion of Mild-steel Tubes

FROM the limited information available it seems reasonable to conclude that in the years during and immediately after the 1939-45 war the life of mild-steel tubes was considerably less than that previously obtained with wrought-iron tubes. Such tubes had service lives of 15 to 20 years and one outstanding case is on record where no replacement of tubes was necessary throughout the 40-year life of the ship. Mild-steel tubes have, in general, a life of about 10 years, but failures have been reported after periods of two to three years and even less. Wrought-iron tubes are no longer manufactured.

A paper entitled "The Corrosion of Welded or Coated Mild-steel and of Wrought-iron Boiler Tubes in Highly Saline Water," by G. Butler and H. C. K. Ison (National Chemical Laboratory, Department of Scientific and Industrial Research), presented to the North-East Coast Institution of Engineers and Shipbuilders, describes an investigation, in collaboration with the British Shipbuilding Research Association, on the corrosion of electrical-resistance welded and of coated seamless tubes in sea-water using model fire-tube boilers, to ascertain whether any practicable means could be devised whereby the service life of mild-steel tubes could be substantially lengthened.

The investigation included (1) welded steel tubes fabricated by cold-forming mild steel sheet and flash welding the butts together; (2) chromized tubes manufactured from steel containing 0.5 per cent. titanium and 0.06 per cent. carbon, a higher titanium/carbon ratio than that used at the present day. The chromizing process involved heating the tubes in an atmosphere of chromous chloride for about eight hours at a temperature of approximately 1,050 deg. C.; (3) aluminium-coated tubes, and (4) phosphated tubes.

The following conclusions relating to mild-steel tubes are drawn principally from the results of the main laboratory investigation, whereas those relating to wrought-iron tubes are based on the examination of tubes taken from Services.

Mild-steel:—(1) Electrical-resistance-welded tubes are subject to deeper pitting than seamless tubes of similar composition. The deepest pits often develop near the line of the weld, but not always. No difference in structure of the metal has been found that would account for the sites of corrosion, but the relatively smooth surface of the tubes might provide fewer nuclei for steam bubble formation and hence lead to fewer but deeper pits; (2) chromized tubes were virtually uncorroded in the tests, but the samples used in this work had become very brittle in the process of chromizing. Although the chromium-iron alloy coating is very resistant to corrosion, localized pitting might occur if the coating were imperfect or became damaged mechanically; (3) aluminium-coated tubes showed no greater corrosion resistance than uncoated tubes. the coating being removed during the test; (4) phosphated tubes gave less corrosion than uncoated tubes, but the advantage appears to be temporary.

Wrought-iron:—The greater resistance to pitting shown by many wrought-iron tubes is probably due mainly to the formation of the hard compact scale on the tubes. The scale consists of a complex magnesium/calcium silicate, derived in part from the silica present in the slag in the iron. The adhesion of the scale to the iron is likely to be helped by the undercutting type of corrosion brought about by the presence of highly resistant zones in the wrought-iron.

Deployment of Manpower at Collieries

THE ABERGORKI SYSTEM

By A. WALSH*

Control of colliery manpower is one of the daily problems which face mine management. In staffing a colliery at the beginning of the shift, last-minute changes often have to be made and the limitations of underground communications make these re-arrangements difficult. In this paper, presented to the South Wales Branch of the National Association of Colliery Managers on September 30, 1959, the author outlines a new method of deploying colliery manpower, using a card-index system and indicating signals between check points, which has been applied for the first time at Abergorki Colliery, South Wales.

THE Abergorki system of manpower direction was designed primarily to accelerate the daily deployment of workers underground, thus increasing effective working time and minimizing the inconvenience to men who have to be moved from their regular jobs to fill a more important one at the beginning of the shift. With the co-operation of Mr. J. A. Hayes, general manager, No. 4 (Aberdare) Area, National Coal Board, the first installation of a system of manpower control, using electric signalling between check positions was made at Abergorki Colliery in South Wales.

* Deputy Chairman, South-Western Division, National Coal Board.

FIG. 1.—GENERAL VIEW OF THE DAY SHIFT CONTROL-PANEL SECTION AT ABERGORKI COLLIERY.

Abergorki Colliery was selected for the first installation because, although it is only a small pit, employing just over 300 underground workers who are all known personally by the manager and undermanager, the underground districts were rather scattered in three directions.

Functions of the Scheme

In detail, the system is designed to give instant information on:

(*a*) The planned complement of each district in the pit, each job being shown separately along with the name, lamp number and qualifications of the regular man for that job.

(*b*) The variations from planned complement currently adopted to meet abnormalities.

(*c*) The name and job of every man present, and how and where those present have been deployed. If a man has been moved from his "regular" job, the system shows at his regular place, where he has gone, and at the job to which he has been transferred, his name and lamp number and the district from which he came.

(*d*) The re-deployment, during an emergency or an incident, of named men during a shift without special enquiries having to be made as to where a particular man is working.

(*e*) A semi-permanent record of how all the men at work underground have been deployed during a particular shift. Higher management can thus check the effectiveness of deployment and note any points for query or for correction on subsequent deployment. This check can be exercized even

after the shift has ended and until the control board has been re-set for the same shift the next day.

(*f*) A light signal against the name of every man from the time that man's lamp is taken out until the time it is returned to the lamp charging rack.

(*g*) Similarly, a light signal against the name of every man working on after the shift is ended. This serves as a safety check and shows clearly who is working overtime and at what job.

(*h*) The jobs a man is qualified or authorized to carry out (facilitating compliance with statutory requirements), and a clear indication of trainees and assistants who need supervision in accordance with statutory requirements.

(*i*) An indication of the number and location of first-aid box carriers and detector-lamp carriers, thus enabling the manager to know the extent to which he is complying with statutory requirements in these matters.

The installation at Abergorki has been operated very effectively. Deployment starts about 20 min. before the end of man-winding time and generally the men are all deployed before coal production starts. After a recent statutory holiday when over 50 per cent. of the colliers were absent and many men had to be moved to other than their regular jobs, deployment was completed by 7 a.m., the end of man-winding time, and not a single man had to be brought back from any job. The same speed of deployment can be maintained at larger collieries.

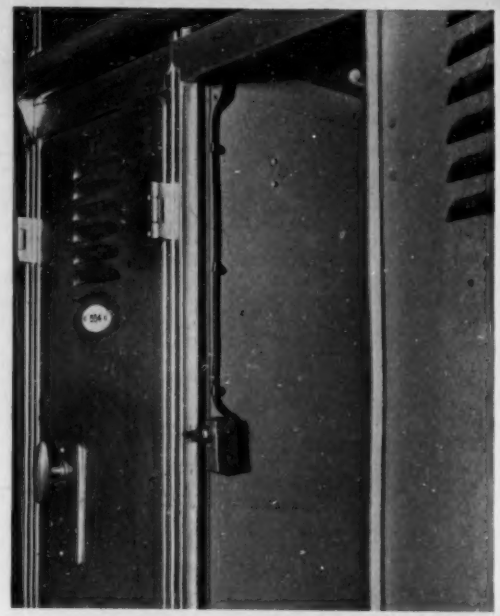


FIG. 3.—MICRO-SWITCH IN A CLEAN-CLOTHES LOCKER.

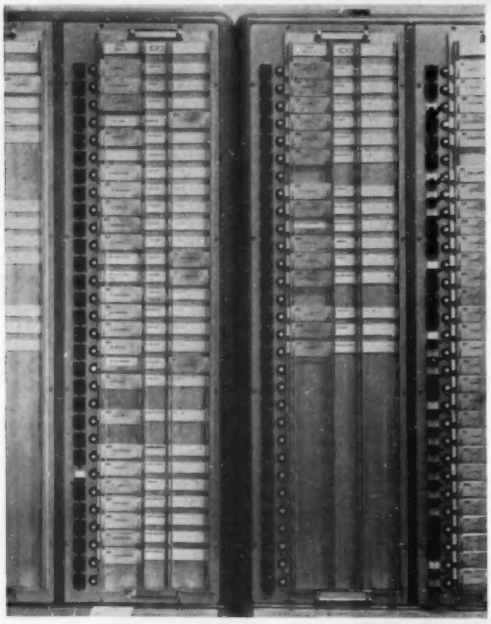


FIG. 2.—DAY SHIFT PERMANENT RECORD CARDS WITH THE RECORDING SIGNALS ON THE LEFT OF EACH CARD.

The deployment control can be sectionalized if it is found that one operator, controlling the indicator panels, cannot deploy quickly enough. The essential thing is that the operator shall have clear instructions on priorities.

Reactions of the NUM and Workmen

The local lodge of the NUM and the men welcomed the system, because it lessened the inconvenience to those who had to be transferred and it provided a safety check and information on action to be taken in cases of personal injury or pit incident.

At the pit bottom there is an indication panel, visible as a man leaves the cage, on which his lamp number is illuminated if he is required to go to some job other than his regular job. He knows then that he must get instructions from the office at pit bottom. This prevents the man going to his regular job and having to be brought back.

The jobs in each district are set out on the control panels in the order in which they occur from the face towards the pit bottom. When read in conjunction with a diagrammatic layout of the pit, kept in the control room, they enable the position of each man in the pit to be determined. The names of men working in a particular section are known on the surface without reference to any deputy's book or to any underground official. In a district which is being salvaged, and where comparatively few men are working at widely separated places, the information on the control panels can

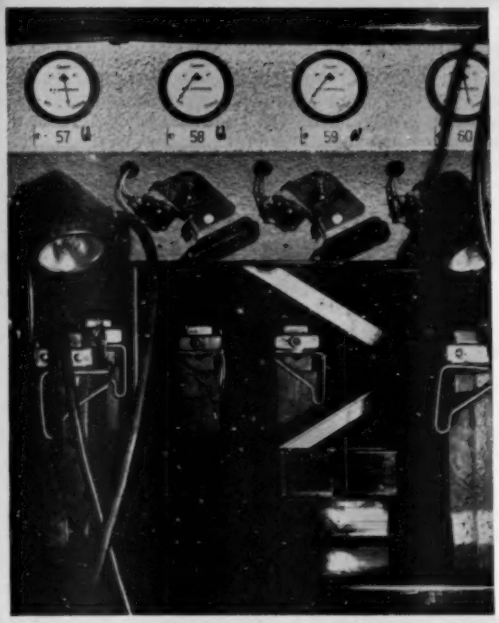


FIG. 4.—MICRO-SWITCH ON THE LAMP CHARGING FRAME.

be sectionalized to show more precisely where the men are working.

Arrangements have been made at Abergorki for fitters, electricians and others who have to move about the pit to pass information on their movements to the control room. The men realize that this is a safety precaution for their benefit and have co-operated wholeheartedly.

An additional safety check is provided by the light bulb against each man's name which remains alight until his lamp is returned to the charging rack. Each man's permanent card on the panels is marked with the code number of his own doctor. This is used in association with a list of doctors and their addresses and telephone numbers kept in the control room. In some small hospitals there is no resident doctor and the man's own doctor has to be brought to the hospital.

The Control Board

The control board is divided into three sections, one for each shift. Fig. 1 is a general view of one section at Abergorki. In future installations the panels will probably be mounted on the walls of the room, instead of being free-standing in the centre.

Each of the sections contains frames designed to hold, for each man to whom a lamp number is assigned, a "permanent" and a "transferable" card. Each frame at Abergorki caters for 30 men. In future installations each frame will take 40 cards. As each district is normally shown separately, the number of frames in each section of the control board is determined by the number of districts and of the men working on the particular shift. The "permanent" card is so called because it remains permanently in the "regular" place of each man in the underground complement.

To the left of each man's permanent card in the frame (Fig. 2) are two signals. One is a relay-operated flap which falls when a man's clean-locker door is opened, and stays in that position until re-set manually. The second is a small light bulb which lights as soon as the man's lamp is taken from the charging rack, and remains on until the lamp is returned to the rack. The operator thus knows when the man arrives at the pit-head baths and when he takes out his lamp.

Micro-switches, as shown in Fig. 3, are used to initiate the signals from the clean locker and the lamp racks. The switch on the locker is at door handle level. That on the lamp rack (Fig. 4) is placed so that it is opened when the cap lamp is placed in the charging position. Modifications are being considered for future installations to ensure that the switch is open at all times when the lamp is on the rack, whether it is in the charge position or is temporarily set to discharge.

Each switch is separately connected to a master plug board in the control room. The lamp switch and the switch of the locker used by the same man are made into one connection on the master board which is numbered with the man's lamp number. This master board is kept behind the panels and

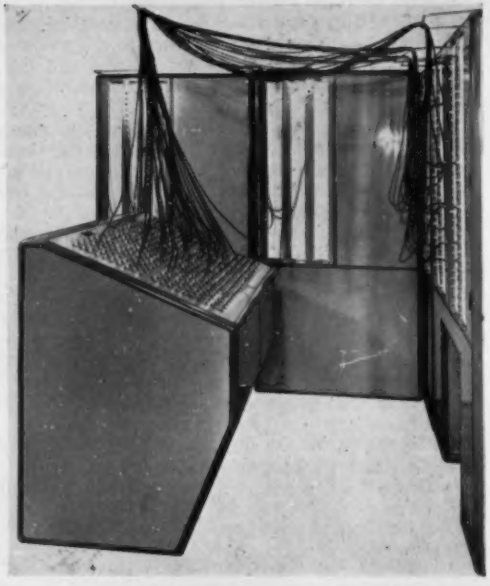


FIG. 5.—MASTER PLUG BOARD AND FLEXIBLE CONNECTIONS.

connections from any particular lamp number on the master board to any particular position on a panel is made by means of a flexible cord similar to the ones used by telephone switchboard operators with a single plug at each end, one of which is connected to the master board, and the other to the appropriate position on the panel (Fig. 5).

It is thus possible to accommodate easily changes of job or shift for any man or any number of men.

"Permanent" and "Transferable" Cards

Each underground man has a permanent and a transferable card. If the transferable cards were removed, the permanent cards and signals would look as follows for a typical district, commencing at the face and working outbye towards the pit bottom.

C.7 Day Shift

101 J. Jones 21	Overman F.L.	1 2 3 4 5 6 7 8 9 D.S.F.L.
192 H. Wills 6	Deputy F.L.	1 2 3 4 5 6 7 8 9 D.S.F.L.
304 W. Parkes 3	Shotfirer L.	1 2 3 4 5 6 7 8 9 S. L.
371 A. Brown 21	Collier L.	1 2 4 7 8 L.
82 C. Dash 20	A/Collier	✗ ✗ ✗ ✗ 9

Each permanent card has three sections. The first gives the man's name and lamp number in the top half, and in the bottom half the code number of his private doctor. By reference to a list posted in the control room, the name, address and telephone number of the doctor can be ascertained quickly.

The second section of the card gives the man's regular job. In effect this column gives the complement for the district. The additional letters indicate: "F"—a qualified first-aid man and box carrier. "L"—a detector lamp carrier.

The third section gives details of the underground jobs for which that man is qualified, able and willing to do.

The complete code is as follows:

1—Competent to act as a collier.
2—Competent to act as a packer.
3—Competent to act as a ripper.
4—Competent to act as a conveyor mover.
5—Competent to act as a cutterman.
6—Competent to act as a steel withdrawer.
7—Competent to act as a borer.
8—Competent to act as a haulage driver.
9—Competent to act as a journey attendant and rider.
D—Qualified as a deputy.
S—Qualified as a shotfirer.
F—Qualified as a first-aid man.
L—Qualified as a detector-lamp carrier.

Any operation in which a man is not competent is not referred to on his card. If he is an assistant and not a principal an oblique line is drawn through the code number for that particular job. Thus, the underground worker, C. Dash, whose regular job is assistant collier on C.7 face is qualified to act as an assistant collier, assistant packer, assistant ripper, assistant conveyor mover and as a journey attendant and rider. He must, therefore, be under supervision while doing jobs as an assistant. He is not qualified to act as a cutterman, steel withdrawer, borer, haulage driver, or as a deputy, shotfirer, first-aid man, or detector lamp carrier.

The first five items of the code are standard; they are the five face operations which are the extent of formal face training. The others will be according to the need of the colliery. Those referred to above are the ones selected by the manager at Abergorki.

The nine numbers and letters are easily accommodated on the card. Other particulars may be added at will. The card is $\frac{1}{4}$ in. wide and could take three lines of code numbers if necessary, *e.g.*, a man's age group can be indicated by a code number or by tinting the card. In some working places it is a rule that a man over 55 years of age is not placed on certain haulage jobs. Chargemen can be indicated by the letter "C."

It will be seen that the card can carry any amount of information of this nature. Its primary purposes are to assist deployment and to enable it to be done on a pit rather than a district basis.

A man who is a "spare" or "market" man is shown apart from the complement of the districts, *e.g.*:

10 N. Walters 8	Spare Collier C.7	1 2 3 4 6 8 9

Even though he were sent regularly as a substitute on a particular face he would not be shown on that face complement, unless he had been specifically appointed to a regular place there. Salvage and maintenance men not continuously in one district would be dealt with similarly.

The "transferable" card gives the man's name, lamp number, the reference number of the district in which his regular job is and the code details of any job in which he is qualified to act as an assistant, but not as a principal. This is moved when the man is transferred or absent. It is normally in front of and covering that part of a man's permanent card which gives his name and lamp number. It is easily removable from the frame.

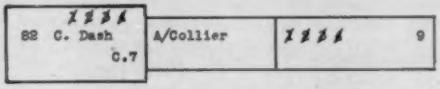
The place on the panel allotted to A. Brown, collier, would appear thus:

371 A. Brown C.7	Collier L.	1 2 4 7 8 L.

The reason for marking on a man's transferable card particulars of the jobs in which he is only qualified to act as an assistant is to ensure that, if transferred, he is put under the supervision of a principal. For instance, if the C. Dash, referred

to previously had to be transferred to a packer's job, the operator on the control board would notice from the third section of his permanent card that he was only an assistant packer, but unless there was some indication on his transferable card, the operator might forget to repeat that fact when finally going over the deployment position with the official or under-official underground. There is no need to record the jobs in which a man is a principal. He would not be moved to any job for which he was not qualified.

The place on the panel allotted to C. Dash would appear thus:



Use in Deployment

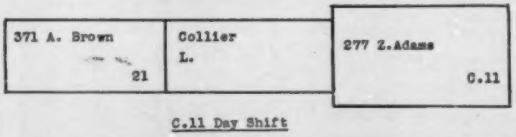
The operator has two indicators to record the presence of each man: (1) a relay flap which falls when the door of a man's clean locker is first opened and (2) a light bulb which lights as soon as a man's lamp is taken from the rack.

As it generally takes at least 15 to 20 min. from the time a man first opens his clean-clothes locker to the time when, after taking his lamp he is lowered underground, the operator can start deploying on the flap signals 15 to 20 min. before the beginning of the shift, making a final check about 10 to 5 min. before the last wind. The operator soon gets to know individuals' habits, who comes early and who at the last minute. In practice, therefore, deployment starts about 20 min. before the last wind, and is usually completed just before the end of winding time.

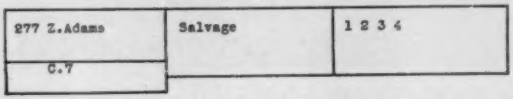
Deployment proceeds in the following manner. If a man's flap signal does not fall, he is regarded as absent. If his place is to be filled by another man, that man's transferable card is transferred to the "substitute" space opposite that of the man for whom he is substituting, *i.e.*, over the third section of the permanent card of the man who is absent. At his regular place, the transferred man's transferable card is replaced by a narrow card indicating to which district he has been sent.

For example, suppose that Mr. Brown, mentioned previously, is absent and is to be replaced by Z. Adams, a salvage worker from C11. Their "regular" places on the control board would then be:

C.7 Day Shift



C.11 Day Shift



Arrangements for Men Working Double Shifts

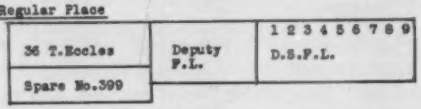
Provision has to be made for cases when a man is working a "double" shift. For example, T. Eccles, a deputy on the day shift, in C7 is asked to work the afternoon shift because the afternoon deputy, A. Mann, has not turned up and no substitute is available. His regular lamp will have to be replaced. He is given a "spare" lamp, not that of another man. The procedure on the manpower control panel is as follows. His transferable card will be put in the first column of the spare lamps against the lamp number of the spare he has taken, say, Spare No. 399. It will be replaced by a narrow card marked "Spare No. 399."

In the job column of the spare lamp allotted to him will be a card "Doubler No. 1." In the "Substitute" column is a card indicating that he has gone to C7. A card marked "Doubler No. 1" will go in the substitute column against the name of the deputy for whom he is substituting.

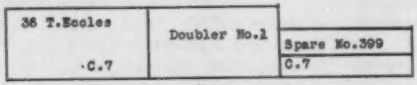
When deployment is completed the various positions on the panels will appear as follows:

C.7 Day Shift

Eccles' Regular Place

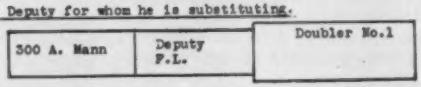


Spares Section



C.7 Afternoon Shift

Place of Deputy for whom he is substituting.



Any second and subsequent substitutes (doing a double shift) would be "Doubler No. 2," "Doubler No. 3," and so on.

The transferable card of an absentee is removed on completion of the deployment exercise, so that anyone subsequently consulting the control board can see who is absent. It is essential where, for example, there are three colliers missing from a face of 20 men, but the other colliers are prepared to clear the face with one substitute only.

A master switch is fitted on the control board which can be used to cut off the current and so avoid lights burning unnecessarily on the control board. Future installations will incorporate a push-button check of the lamps.

At the completion of the deployment exercise: (*a*) Every man who is absent will have had his "transferable" card removed, leaving fully exposed his "permanent" card showing lamp number, name and job; (*b*) every man who has been moved from his "regular" place will have

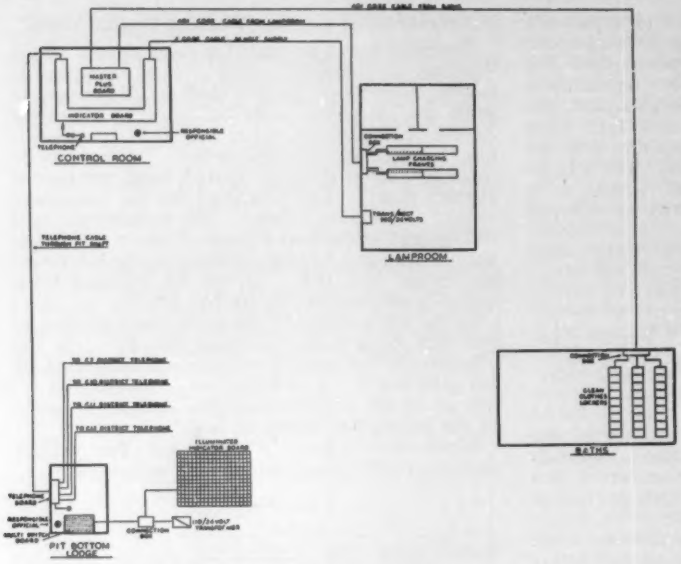


FIG. 6.—LAYOUT OF THE SYSTEM.

had his " transferable " card removed and replaced by a narrow card showing the number of the district to which he has been transferred. This card is narrow enough to leave exposed the lamp number and name on his " permanent " card; and (*c*) every substitute will have his " transferable " card in the substitute column of the district to which he is transferred opposite the name of the man for whom he is substituting. The card gives the name and lamp number, the district from which he came and particulars of jobs on which he is not qualified to act without supervision.

Communications on Deployment

The manpower control room is on the surface, and the operator has a telephone of the type which leaves both his hands free. He is connected by a direct line to the pit-bottom office where by means of a switchboard, he and/or the official (or other operator) at the pit bottom can speak with any or all districts.

Before starting deployment the control board operator makes sure that the undermanager or the official deploying men at the pit bottom is in position in the pit-bottom office. This official also has a telephone set of the type to leave both hands free.

Information about the deployment moves made is given to the pit-bottom official as they are made, *e.g.*, " Z. Adams 277 from C11 to substitute for Brown C7."

When deployment has been completed, some 5 to 10 min. before the last wind, each district is plugged in, in turn, by the telephone switch, so that the deputy and the pit-bottom official hear the final recapitulation of the position.

The control board operator may say, for example, " C7 district—you are short of 4 colliers: 89 Tom Jones, 377 A. Brown, 78 Jacky Williams and 67 Ted Harris. The substitutes are 306 W. Edwards from C5, 205 H. Watkins from C3 (salvage), 104 John Jones from C11 and 277 Z. Adams from C11. You are 2 hauliers short, 53 J. Harrison and 50 Tom Jones. The substitutes are, 28 Charlie Edwards from C3 (supplies and haulage) and 31 Evan Parry from C3."

Each deputy is dealt with in turn in respect of his own district. Each deputy normally knows the final position before the last wind. As the meeting places are inbye, he will often have this knowledge before any men reach him.

The question of telephones is extremely important and the layout, shown in Fig. 6, indicates the flexibility of the system. The direct line to the pit bottom, and through the switchboard to any or

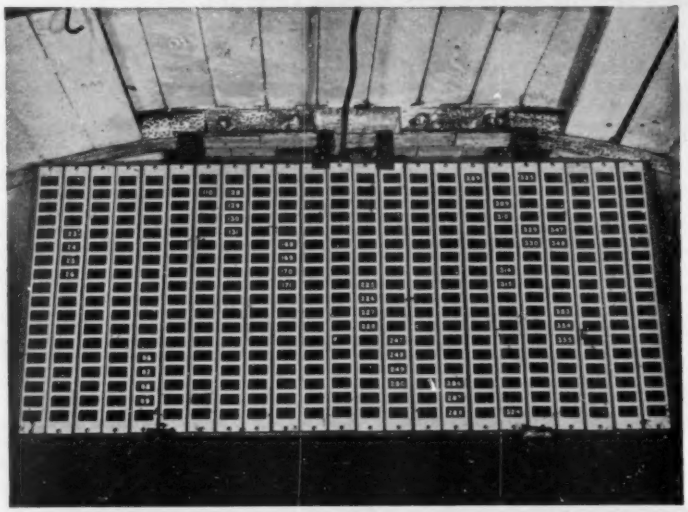


FIG. 7.—UNDERGROUND INDICATOR PANEL FOR THE REDEPLOYMENT OF LARGE NUMBERS OF MEN.

all of the districts enables the control-board operator to clear doubtful points quickly, and not only to communicate but to receive information without delay. Before starting depolyment he can ascertain from each deputy whether, and if so to what extent, the normal manpower complement needs varying. For example, three extra men may be needed next shift to clear a fall; a face may have been only partially cut, and the colliers cannot be given work there for another hour.

In the pit bottom an indicator panel is hung in a position from which it can be seen by anyone coming from the cage (Fig. 7). If a man is to be redeployed the pit-bottom official can illuminate the man's lamp number on the indicator panel, which is associated with a notice: "If your lamp number is illuminated, please call at the Pit-bottom Office."

Action at the pit-bottom office is determined by the size of the deployment problem. If only a few men are normally involved they can be told by word of mouth, or instructions can be written on a black board.

Where the deployment problem is large, there are several alternatives which can be adopted to avoid the pit-bottom official having to break off the telephone connection to speak to each man who is being transferred. It is not necessary for the official at the pit bottom to keep a written record. The deputy in the district is given full particulars by phone and any detail can be checked at any time with the control board.

A simple system where large numbers are involved is as follows: as the pit-bottom official puts the switch over to illuminate a man's number he can drop a ring, with the number (or colour) representing the district to which the man is to go, over the switch lever. He can then put a district label (*e.g.*, C7) in a numbered slot (there being a separate numbered slot for each individual worker) open to his office on one side and to the man in the roadway on the other. The man takes the label from the slot bearing his lamp number and hands it to the deputy at the meeting place.

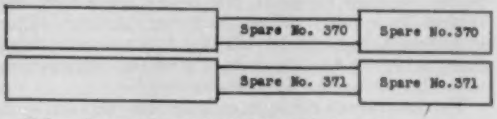
The Safety Aspect

An indicator light continues to burn against the man's card as long as his lamp is not put back on charge in the lamp rack. Providing lamproom discipline is tight, these lights provide an additional and immediate check on men still underground. It is possible that the indications on the control panels may be regarded as replacing one of the specified safety checks. The light also helps with the control of overtime. After the end of the shift it is possible to see at a glance who is still working and at what job.

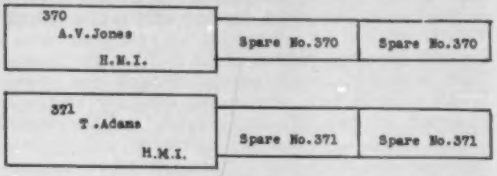
All who go underground but have no regular underground job at that particular colliery, or have no special lamp allocated to them, are classified as "visitors." This will include, for example, surface fitters going specially underground, HM inspectors and divisional officials. They should always be given a spare lamp (not that of a man who happens to be absent) and particulars should be given to the control-board operator.

Against each spare lamp light bulb is a permanent card, marked in each section with the lamp number. There are also two transferable cards. The first, in the first section is blank, ready to have marked on it the name and status or business of the visitor.

When not in use, the "Spares" section of the control board will look as follows:



When in use it might look as follows:



The second set of detachable cards numbered Spare No. 370 and Spare No. 371 will have been put in the panels of the district or districts being visited.

Additional Telephone Connections

It is essential for the control-board operator to be able to check quickly with the pithead baths attendant and the lamproom attendant on certain matters. For example, why has the man's locker flap fallen, but no lamp appears to have been taken out? Is it because someone other than the man concerned has opened the locker, or is it that the bulb of the lamp signal has burned out? Again, why is a certain lamp bulb burning?—has someone taken a lamp off charge or removed it without following the lamproom rules?

The best arrangement is to put intrinsically safe phones in the baths and lamproom which can be switched into the circuit at will by the control board operator. Failing that, there should be ordinary phone connections to the baths and lamproom.

The system is capable of a good deal of extension for other purposes. It can, for example, enable daily and cumulative totals to be built up quickly of overtime, of collier shifts worked, development shifts worked, of variances from planned deployment and of absence. It can also be of use to timekeepers.

The author acknowledges the whole-hearted co-operation of Mr. J. A. Hayes and his staff who were concerned at Area and colliery level, and particularly that of Mr. H. B. Pritchard, the Area electrical engineer. Acknowledgment is also made to Automatic Telephone & Electric (Wigan), Limited, who manufactured the control-room equipment, and to Oldham & Son, Limited, for models of parts of the installation.

Emergency Stop for Armoured Conveyor

USED successfully at Bold, Wood and Sutton Manor collieries, is a system which provides a simple means of stopping an armoured conveyor instantly in case of emergency. Devised by Mr. G. V. Jones, electrical engineer at Bold Colliery, North Western Division, National Coal Board, the system is applied to an Anderton shearer-loader installation, but can be adapted for use in installations where other machines work in conjunction with the armoured face conveyor.

The essence of the system is to link the conveyor control circuit with the power-loader circuit in such a way that when the emergency stop switch on the loader is actuated, the conveyor is also halted. This is effected by connecting an extension circuit into the sequence control of the multi-motor panels. This extension circuit passes through the power loader control box, where two auxiliary switches, mounted in parallel, are provided. Thus when either switch is closed the conveyor will operate normally, but when both auxiliary switches are open the conveyor circuit is broken and the conveyor stops.

These auxiliary switches, A and B, are so arranged that switch A is normally closed and switch B is open when this power loader is shut down, so that the conveyor can be operated independently of the power loader. When the power loader is started, switch B is closed before switch A is opened, closing of switch B maintaining the interlock circuit of the multi-motor panels and allowing the conveyor to be run.

If the motor of the power loader is stopped, switch B opens automatically, shutting down the multi-motor panels and stopping the conveyor. By means of a timing mechanism, automatic reclosing of switch A is delayed to allow all contactors in the multi-motor scheme to open. Normal conditions are then automatically obtained for restarting.

An additional circuit is provided, also leading into the loader box, to illuminate Heyes's FLP visual indicator when the emergency stop is employed. Operation of the loader box actuates another switch C in this indicator circuit. A duplicate emergency arrangement is fitted in the pre-cutter box when a pre-cutter is used in conjunction with a power loader.

Mineral Development in Kazakhstan

EXTENSIVE industrial development in Kazakhstan, formerly the most under-developed and sparsely populated of the colonies of Tsarist Russia, is provided for under the current seven-year plan of the USSR for the period 1959-65. Capital investment during that period is to be almost two and a half times as great as it was during the previous seven years.

Special emphasis is to be laid on the development of the mining and metallurgical industries, ferrous and non-ferrous, and on the engineering and chemical industries based on them. Enterprises of particular importance in this development are, in the first place, the Karanganda steel works and the Yermakov ferro-alloys plant, both of which will substantially increase their output. These are to be reinforced by a new integrated iron and steel plant at Temir-Tau, which is to have the largest blast furnace in the world and to be equipped with up-to-date machinery embodying the most modern technology.

To meet the resultant increase in demand for iron ore, a new plant for the mining and concentration of iron ore, the largest in Kazakhstan, with an annual capacity of some 19,000,000 tons, is being built at Sokolovka-Sarbai, in the Kustanai region. This is expected to increase steel output to an annual aggregate of the order of 4,500,000 tons.

W. European Trade Tariffs

PUBLISHED by George Allen & Unwin, Limited, price 30s.. "Tariffs and Trade in Western Europe" is a report based on studies by Political and Economic Planning, 16, Queen Anne's Gate, London, S.W.1. The report presents a detailed comparison of the tariffs of the 12 main industrial countries of Western Europe and the future external tariff of the Common Market. In addition, it relates these tariffs to United Kingdom imports of the same categories of goods.

PEP has sought to give in a convenient form some of the basic information on trade and tariffs that is required for an analysis of the problems involved in linking together the customs union of the six countries of the European Economic Community and the free trade area of the seven countries of the proposed European Free Trade Association. The report's tables also give some indication of the probable contribution the removal of barriers can make to the expansion of trade, and of the changes in trading patterns that may occur if no means is found of bringing the two groups together.

FORTHCOMING EVENTS

JANUARY 19

Institution of Mechanical Engineers: Meeting at the King's Head Hotel, Newport, at 6 p.m.: "Special and Alloy Castings in Mechanical Engineering," by A. B. Everest.

JANUARY 20

Society of Instrument Technology (Newcastle Section): Meeting in the conference room, Roadway House, Newcastle-upon-Tyne, at 7 p.m.: "Open-hearth Furnaces," by J. Allen.

Mining Institute of Scotland: Meeting at the Mining Laboratories, Edinburgh: "Mining Difficulties in Scotland and their Method of Treatment," by R. B. Dunn.

Institution of Production Engineers (Midlands Region): Meeting at the Wolverhampton and Staffordshire College of Technology, at 7 p.m.: "Powder Metallurgy—its Application to the Production of Engineering Components, and its Advantages and Limitations," by P. R. Marshall.

JANUARY 22

Sheffield University Mining Society: Meeting in the Engineering Lecture Theatre, St. George's Square, Sheffield, at 7.30 p.m.: "Developments in the Yorkshire Coalfield," by R. G. Baker.

JANUARY 28

Coke Oven Managers' Association (Northern Section): Meeting at the Three Tuns Hotel, Durham, at 7 p.m.: "Modern Blast-furnace Operation and Possible Future Trends," by D. Vernon.

National Association of Colliery Managers

JANUARY 18

Midland Branch: Meeting at the Denman's Head, Sutton-in-Ashfield, at 6.30 p.m.: "Control Factors in Mine Management," by S. Vardy.

JANUARY 19

South Wales Branch: Meeting at the Castle Hotel, Neath, at 6 p.m.: "Mine Planning and the Colliery Manager," by J. D. Morton.

Design and Operation of an 80-ton ELECTRIC FURNACE IN RUSSIA

By L. S. KATSEVICH*

The beginning of 1959 was marked by an outstanding event in electric-furnace steelmaking in the USSR; on January 7 the first melt was cast from the largest arc-steelmaking furnace in the country, the DSP-80 of 80-tons capacity. This was designed by the special design office of the Elektropech' Combine, and manufactured by the Novosibirsk electrical heating equipment factory in co-operation with structural engineering and iron and steel works in the USSR. On March 31 the first cast was made from the second 80-ton furnace. The following description has been translated from an article appearing in "Metallurg," 1959, IV, No. 9.

THE entry into service of two high-capacity arc furnaces is the first step in a plan to increase electric-furnace steel production in the USSR by 70-100 per cent. Experience in the design, manufacture, installation and operation of the first 80-ton furnaces will assist Russian industry in the construction and development of electric-arc furnaces of even greater capacity.

The internal diameter of the shell of the furnace is 6,300 mm.; transformer capacity on the highest secondary voltage tap, 25,000 kVA.; limits of the secondary voltage of the transformer (23 taps of 13 V), 417-131 V; maximum (linear) current, 34,500 A.; number of phases, 3; current frequency, 50 cycles; electrode diameter, 550 mm.; number of electrodes, 3; diameter of effective area of strike of the electrodes, 1,750 mm.; maximum electrode displacement, 3,000 mm.; electrode displacement velocity at minimum number of revolutions of the electrode motor, 1.7 m./min.; height of the melting zone (from hearth to top of shell), 2,300 mm.; dimensions of the furnace door, 1,050 by 1,250 mm.; time required to tilt the furnace to an angle of 40 deg., minimum, 1.5 min. The specific approximate consumption of electrical energy for melting a cold charge is 420 kWhr./ton; maximum consumption of cooling water, 60 cub.m./hr.; minimum air pressure in the pneumatic cylinders of the electrode clamp mechanism; 4 atm.; and overall weight of the metal structure of the furnace (without the electrode displacement mechanism), 430 tons.

Tilting the Furnace

The base of the furnace is a cradle with two segments, carried on two welded joists forming the foundation. Tilting of the furnace is effected by two toothed racks, connected by ball joints to the shoulders at the back of the segments of the cradle. Each rack is set in motion by an independent drive. Since both the drives of the tilting mechanism are not self-braking, they are provided with brakes which automatically stop the drive after the electric motor has cut out. Where necessary the furnace can be tilted with one drive, if the brake on the second drive is released.

Both drives of the tilting mechanism are located to one side of the segments of the cradle, which prevents them from being splashed when the slag is being tapped, and leaves the bottom part of the furnace between the segments free for the passage of the slag ladle car underneath the furnace.

On the furnace is located a mechanism for rotating the bath about its vertical axis; this mechanism is provided with two drives which operate jointly or severally. In the latter instance it is necessary to release the brake of the second drive.

The DSP-80 is the first furnace in Russia with a swinging roof. All previous arc furnaces to Russian designs have either a fixed roof (charging through a door) or a car-mounted bath (top charging).

During the process of designing the furnace, on the basis of kinematics a simple system was worked out for the swing mechanism of the furnace roof with an all-cast swing frame, seated on the cantilever arm of a vertical shaft, 750 mm. in diameter. This shaft, which bears against two radial, spherical roller bearings and a self-aligning footstep bearing, is turned by a toothed segment from a drive similar to the drive of the mechanism for rotating the bath.

The roof of the furnace is suspended at four points by chains from the two cantilever arms of a semi-gantry crane fastened to the edges of the swing frame. The lifting of the roof is effected by two worm-screw hoists mounted on the swing frame. The worm drives of both the hoists are connected by a shaft to two semi-clutch couplings, so that in case of necessity it is possible to lift the roof with one electric motor, overloading it for a short time. The roof lifting mechanism is calculated for a maximum lifting capacity of 50 tons.

Electrode displacement mechanisms are mounted on the swing frame in the gap between the supports of the semi-gantry crane. For the layout of the mechanism for swinging the roof which was adopted, it was simpler in operation to fasten the electrode holders on cars, since space could not be found for telescopic masts, which have certain

* The author is at the Special Design Office of the Elektropech' Combine, USSR.

operational advantages over cars, due to the restricted dimensions of the cast roof swing frame.

A kinematic system has been adopted in the furnace for the electrode displacement mechanism with the cable fastened on to the drive drum, as distinct from the system normally used whereby the cable has friction grip. The electrodes are lowered under the action of the weight of the unbalanced part of the car; meanwhile the drive of the electrode displacement mechanism is operating under no-load conditions. Such a system has two advantages in operation: the load on the electrode when it comes to bear against the charge is at a minimum, and the wear on the cable working in the grooves of the drum without slipping is small. But an essential condition for the reliable operation of the electrode displacement mechanism is the faultless working of the arrester mechanisms for limiting the lift of the car, and of the travel limiting switch which operates when the cable goes slack.

The arm of the electrode holder is fabricated from solid drawn steel tube 426 mm. in dia. Its front flange is connected to the cast bronze body of the electrode holder, and the rear flange is fastened through an electrically insulated insert to the body of the car, which is made of non-magnetic steel. The car has 16 guide rollers with roller bearings, running along the machined surfaces of the mast which is fixed to the roof swing frame. The current to the body of the electrode holder is led through two copper tubes of 150 mm. by 10 mm. insulated from the body of the car.

Secondary-current Feed Network

As distinct from the system of secondary current feed for arc steelmaking furnaces which is generally adopted both in Russia and elsewhere, namely "the star network on the electrodes," in the DSP-80 furnace for the first time in practice there has been developed a system of secondary current feed network of "a delta on the electrodes." In order to avoid complications in the design of the secondary current feed system and operational difficulties connected with it, the delta on the electrodes is formed asymmetrically, *i.e.* with magnetic compensation of only four out of the six phase current feeds.

The flexible current cables of the first two DSP-80 furnaces were completed in the form of six festoons of MGE-500 bare copper cables, with 32 cables in each festoon. Such a measure was adopted in view of the absence of flexible cables of heavier cross-section.

Even after the first few days in service the great operational advantage of a furnace with a swinging roof was apparent. Whereas for a furnace with a car-mounted bath the working platform in front of the furnace has a large cut-away section, covered over with a movable platform, a swinging roof furnace on the other hand is serviced from an unbroken fixed working platform which has considerable structural strength. At the same time the area beneath the working platform of a swinging roof furnace is free, while for furnaces with car-mounted bath this space is occupied by a moving platform and the supports of the mechanism for moving the bath.

The absence of heavy and bulky mechanisms for moving the bath, and likewise of a moving platform with two mechanisms, substantially increases the degree of operational reliability of the mechanical part of a swinging roof furnace.

Before the first furnace was started up, fears were entertained lest the swinging roof would create great complications in operation. These fears proved unfounded, and the mechanism for swinging the roof proved entirely reliable in operation.

Operational Experience

At the rate which was chosen during planning for swinging the roof (3 deg./sec.), considerable swaying of the hoist and the roof was observed after the motor for swinging the roof had stopped, which sometimes led to the fracture of the electrodes. During subsequent operations the rate of opening the roof was halved, after an additional open cylindrical coupler had been inserted into the transmission, thanks to which the time for opening the roof was correspondingly increased, while the swaying was substantially reduced.

During the operational working it was found that the mechanisms for tilting the furnace with two non-self-braking drives, and the mechanism for lifting the roof with two worm-screw hoists connected by a rapid-running shaft, were entirely reliable in operation.

The mechanism for rotating the bath with two non-self-braking drives operates extremely reliably, and the power of one drive is entirely adequate to rotate the bath if the motor of the second drive cuts out. The design of the supports on which rests the circular girder of the bottom part of the body of the furnace has proved very convenient in operation. Cast open support brackets with one roller bearing and one thrust roller bearing eliminate seizing up of the rollers, and the roller bearings in the rollers appreciably reduce the power required to rotate the bath.

Basing their opinions on experience in the operation of furnaces in the USSR of 10 to 40 tons capacity and of certain furnaces abroad, which have insufficiently reliable mechanisms for rotating the bath, many metallurgists have considered that it is not advantageous to rotate the bath. Engineers consider that a weak mechanism for rotating the bath is a source of additional hold-ups to furnaces.

At the present time the advantage of rotating the bath of an 80-ton furnace has been entirely confirmed. Therefore in the development of 180-ton furnaces intended for operation by the scrap process, it is necessary to provide for a mechanism to rotate the bath.

Even in the initial stage of operation of the furnace mistakes were discovered in the design of the electrode displacement mechanisms, which essentially consisted of ill-conceived decisions about the control mechanisms, both about the displacement of the car outside the electrode mast, and

New Continental Oxygen-steelmaking Processes

TRANSLATIONS of nine papers, presented on the opening day of the Journées Internationales de Siderurgie, in Liège, during 1958, have been reprinted from IRON AND COAL in the form of a booklet bearing the above title. Readers who are interested in receiving a copy, or copies, should send their orders to the publisher, IRON AND COAL TRADES REVIEW, 17/19, John Adam Street, Adelphi, London, W.C.2. The cost per copy of this 54-page booklet is 10s. 6d., post free. A remittance should accompany orders.

also about the displacement of the counterweight inside the mast. Despite the fact that all the guide rollers of the car are fabricated with roller bearings, during the process of operation the body of the car sometimes jammed in the guides of the electrode mast.

Apart from this the fixing of the axes of rotation of the guide rollers in adjustable cams was not fabricated sufficiently accurately, as a result of which the rollers ran at an angle under the action of the considerable loads applied obliquely to the body of the car. The counterweight which was built up from a large number of unmachined cast-iron weights had an insufficiently rigid central tie rod, 50 mm. in diameter.

On assembling such a counterweight it was observed that there was a large permanent set of the tie rod due to bending; in consequence, the distorted counterweight jarred violently against the guides of the support structure.

During operational working of the furnace the jamming of the car and of the counterweights was cut out. For this the radical solution is the fabrication of the counterweights in the form of a rigid structure of slabs, and in order to reduce the friction during the operation of the furnace in the tilted position, it is recommended that the counterweights should be provided with guide rollers with roller bearings.

In order to avoid short circuits during the process of operation, a change was made in the suspension of the festoons of bare flexible cables on the side of the transformer bus-bars, executing it in the same way as the current feed on the side of the electrode mast. Such a suspension made it possible to insulate the festoons with wooden insulating clamps of rectangular cross-section and separate the adjacent festoons with wooden spacers.

The geometrical dimensions of the furnace make it possible to charge it in one go to the nominal capacity where the density of the charge is 1,500-1,600 kg./cub. m. In actual working the charge which is placed in the furnace has a density of about 1,100-1,300 cub. kgm., which permits 60-65 tons to be charged at one time. Under these conditions the furnace necessarily works at times with one, and at others with two, supplementary charging periods, which substantially increases the duration of the melting period and reduces the output of the furnace.

Since supplementary charging of the furnace is unavoidable if lightweight scrap is charged, it would be advantageous to increase the total charging capacity of the furnace to 90-100 tons. But the casting crane of 125 tons capacity chosen by Gipromez is able to take only 80 tons of liquid metal in the ladle, which in practice makes it impossible to increase the output of the furnace. For a furnace of a nominal capacity of 80 tons, the loading capacity of the ladle crane should be not less than 150 tons.

Occupational Safety and Health Centre

EARLY in 1960 the Industrial Safety Division of the Royal Society for the Prevention of Accidents will begin its part in an international scheme intended to promote wider understanding of industrial safety and allied subjects among safety officers, works managers, industrial physicians, trade unionists and research workers. The aim of this scheme is to make information available on literature and legislation dealing with all aspects of occupational safety and health. Every type of industrial activity will be covered, including engineering, mining and quarrying, transport, public services and civil engineering.

Distribution of information will be made through the International Labour Office by means of index cards. Literature to be dealt with will include reports and specialized publications of all descriptions, and books and periodicals from countries throughout the world. Laws and regulations, codes, standards, specifications, instructions and other texts of a legislative nature will also be given systematic coverage. The cards, each with a classification code number, will consist of a complete index of subjects and cross references.

Cards will be obtainable, in complete sets only, from the national organizing centre which, in Great Britain, will be the Royal Society for the Prevention of Accidents. If more complete details of information published on any of the cards is required, it will be available on application to RoSPA, which will have access to texts of original documents.

Among organizations in Britain which have agreed to co-operate with the society are the British Iron and Steel Federation, the Department of Scientific and Industrial Research, and the Safety in Mines Research Establishment. All these organizations will assist by making documents and data available to the society for transmission to the ILO.

The cost to British subscribers will be £14 5s. a year, and all enquiries should be addressed to the Royal Society for the Prevention of Accidents, Terminal House, 52, Grosvenor Gardens, London, S.W.1.

CONSTRUCTION of the fourth blast furnace at the Lenin Steelworks in Poland has begun, according to a BBC news broadcast.

French Metallurgical Society

Metallurgists from many countries met in Paris for the recent annual autumn meeting of the Société Française de Métallurgie, the underlying theme of which was the behaviour and detection of gases in metals. Some of the papers given on ferrous metallurgy are summarized below.

The Heterogeneity of Large Forging Ingots

THIS investigation into the study of the heterogeneity of large forging ingots discussed by C. Roques, P. Martin, Ch. Dubois and P. Bastien (Le Creusot) was originally begun by the Schneider Works, but was continued by a special committee set up by IRSID. Certain investigations on the subject have already been published, but they were mostly based on detailed examination of a small number of ingots.

It seemed desirable to ascertain the nature of heterogeneity in large forgings based on inspection, but limited to the essential features, and carried out on a sufficiently large number of ingots to allow the results to be satisfactorily analyzed. For that reason, a total of 150 ingots, with individual weights ranging from 7 to 150 m. tons, were examined.

It was possible to establish that the total segregation of a given element *i.e.*, the range between maximum and minimum contents, was appreciably proportional to the content of the element in question. There is, then, a basis for expressing segregation as a relative value—proportion of segregation. It was also shown that the rates of segregation of different elements follow similar laws. In particular, for a given ingot, the size of the main segregation of impurities and of the alloying elements is proportional to that of carbon, results being given for the elements: S, P, As, N, Si, Mn, Ni, Cr, Mo.

Consideration was also given to establishing the shape and the distribution of segregations in the mass of the ingot. Note was taken of the extent of the axial zone containing local segregations of straight V shape, it being established that, in a certain number of ingots, micro-holes and micro-cracks usually accompanied the segregations in straight V's.

The following conclusions were drawn: (*a*) In the field of variations in steelmaking factors which have been studied, none other than the tonnage of the ingots has had any significant effect on the proportion of segregation of carbon and of the various elements mentioned; (*b*) distribution of segregations is a function of the weight of ingot. In particular, the distance along the axis of the zone affected by negative segregation is relatively less in the case of large ingots; (*c*) the extent of the axial zone affected by segregation in straight Vs and by loosened structure is not in relation to the weight of the ingot. It appears to be dependent on composition, particularly on the carbon and sulphur contents, and on casting conditions, particularly temperature.

A certain number of indications have been noted as regards the distribution of oxygen in the form of oxide inclusions and of hydrogen. It has been shown that the laws governing segregation of these two elements are distinct from those which apply for the whole of the other elements taken into consideration.

Steels with and without Vanadium for Forging

The object of a research conducted by G. Delbart, M. Jaspart, A. Clerc and A. Constant (St. Germain-en-Laye), was to determine the possibilities of improving, by the addition of vanadium, the mechanical properties of heat-treated steels for forging. The results already obtained by other investigators deal, more especially with small pieces like tensile and shock test-pieces, and so far as is known, there are few results on the influence of V in the case of large size forgings.

It is known that, when properly put into solution during austenization, vanadium allows of grain refinement being obtained, on the one hand, and of increased resistance to softening during re-heating being obtained on the other hand. One of the problems to which special interest was attached was to find out to what degree the addition of V would allow of higher temperatures being used in reheating large forgings while retaining the same mechanical characteristics. Industrial research has been done on several grades of steel: (*a*) Carbon steel with 0.038 per cent. V, and without V; (*b*) Cr-Mo steel, grade 35 CD4 with additions of 0.053 per cent. and 0.287 per cent. V; and without V; grades 35 CD4: C.30/39 per cent.; Cr 0.8/1.2 per cent.; Mo. 15/30 per cent.; (*c*) Cr-Ni-Mo steel, grades 30 CD12, 30 CND8, 30 CND12 and 30 NCD11, with additions of 0.038 to 0.080 per cent. V; and without.

In order to ensure good solubility of the V in steel 35 CD 4 with 0.287 per cent. V, the temperature of austenization for this steel was raised to 900 deg. C. Systematic study was made of the quenchability of these various grades, of grain growth, and of the influence of V on transformation points and of the kinetics of changes under isothermic and anisothermic conditions. The mechanical properties, taken longitudinally (and transversely for large sections), have been ascertained on 5-mm. to 240-mm. ($\frac{3}{8}$- to 9½-in.) dia. sizes, after quenching and tempering in the working range (550 to 650 deg. C.).

The results obtained can be summarized as follow:

(*a*) *Carbon Steels (Treated).*—The addition of 0.038 per cent. V does not seem to affect the hardenability. However, in a general way, V raises the elasticity/tensile ratio and reduces softening by

tempering. For small 5-mm. dia. bars, with fully martensitic structure after quenching, V raises the tensile and elasticity, without appreciably lowering the other characteristics. But for sizes above 15 mm. ($\frac{5}{8}$ in.) partial hardened V does not cause any appreciable change.

(*b*) *Cr-Mo Steels* (*35 CD4, with and without V*).—The influence of vanadium on the properties of a 35 CD4 steel has proved very interesting for sizes up to 200 mm. (8 in.) dia. both in the normalized-tempered and in the quenched-tempered conditions.

In general, the tensile and the El/T ratio are appreciably increased, even after annealing followed by slow cooling. The addition of 0.287 per cent. V produces a great refinement in structure. The effect of V in this amount is so marked that the same mechanical properties, taken transversely, are obtained on 8-in. rounds of steel without V, hardened and tempered at 550 deg. C., as on a bar of the same diameter of a steel with 0.287 per cent. V, normalized and re-heated at 650 deg. C. The impact strength in particular is not reduced.

The addition of V allows the tempering of forgings to be raised to higher temperatures. Moreover, with vanadium steel, it is possible to provide for simple normalization followed by re-heating to achieve the same properties as with quenching and tempering of a steel without vanadium. This is of special interest in the case of parts which cannot be quenched.

(*c*) *Ni-Cr-Mo Steels* (*with or without vanadium*).—These are high-quenchable steels with which V shows no effect on hardenability. Still, the addition of V lifts the tensile and the El/T ratio fairly noticeably after reheating between 550 and 650 deg. C. For these steels, the minimum effective V content seems to be about 0.04 per cent.

Tests of a more fundamental nature are being continued on carbon steels and on Cr-Mo steels containing 0 to 1 per cent. vanadium and coming from the same master-cast.

New Ferritic Steel for Steam Tubings and Super-heaters

The 2.25 per cent. Cr-1 per cent. Mo steel, which has been generally used in power houses up to a metal temperature of 575 deg. C., reaches its limit of service when the rise in thermal output requires a rise above that temperature. This demands the use of austenitic steels. The Belgian committee for the study of flow of metals at high temperatures, before deciding on this solution, and with the object of saving in cost, state L. Gottignies and M. Caubo (Brussels), in their paper on new ferritic steam tubes and super-heaters, went into the question of extending, as far as possible, the use of these steels.

Investigations were directed on the line of trying to get structures favourable to heat resistance, and the following method was pursued: (1) Additions of elements leading to the formation of carbides by slow evolution at service temperature; and (2) heat treatments such that favourable structures giving initial precipitation of a large number of very small precipitates, would be obtained.

The choice of a steel for steam tubes has to take into consideration quality requirements which are sometimes contradictory one of another, principally, resistance to fracture by long-term flow, ductility, forgeability, weldability, not forgetting heat-treatment, which must be industrially possible. All these various properties have been systematically studied with a view to obtaining an improved formula of ferritic steel.

In the class of ferritic steels resisting oxidation, chrome is the chief alloying element to be considered. Two zones were studied, one ranging from 0.5 to 3 per cent. and the other from 8 to 12 per cent. Improvement in the former range was first dealt with. As for the other alloying elements, chief consideration from the point of view of resistance to flow had to be given to molybdenum, vanadium and tungsten.

When the analysis was settled, two kinds of heat-treatment were visualized: (1) a dual treatment consisting of austenization, rapid cooling in air and re-heating, resulted in structural hardening of the steel. This treatment can be carried out on an industrial scale for super-heater tubes, cooled one by one. (2) This treatment was austenization followed by slow cooling in free air, this giving a more developed structural condition than the first and, consequently, being a little less resistant to heat. This treatment is similar to that for cooling large size tubing in free air.

The steel, thus developed, has satisfactory properties for working and shaping either hot or cold. With hot working, saving can be effected by reductions in metal thickness compared with steels now being used. If the same thickness is used, higher temperatures and pressures can be attained in service. This improved resistance is only slightly adversely affected by welding. Research work on this steel has involved more than 600,000 hr. of flow and fracture tests, these in some instances extending to 20,000 and up to 50,000 hr.

Users and inspection control bodies in Belgium, interested in the formula put forward by the committee, have joined in getting it into industrial service. The actual use of the steel in industry, from the point of view of safety, is protected by laboratory control which demands that test-pieces cut from the tube assemblies be in their hands 10,000 hr. in advance of required test results, the samples being taken both from the basis metal and also from the mixed and homogeneous welded tube assemblies. Results obtained from these controls confirm all expectations based on the results of the research work.

Forgeability of Ferritic Steels for Super-heater Tubes

By means of torsion tests at varying temperatures, it has been shown that the forgeability of a 9 per cent. Cr steel, containing various additional elements, is greatly influenced by its structure at forging temperature. O.-L. Bihet and M. Caubo (Liège), in their paper on forgeability of ferritic steels for super-heater tubes, point out that the

structure which gives best forgeability is one which is completely ferritic at forging temperature. However, certain bi-phase structures also lead to good forgeability, being in every case superior to the values obtained for fully austenitic structures.

It is, therefore, possible to obtain in the grade of steel under consideration a ferritic structure or a slightly bi-phase steel at 1,250 deg. C., by balancing the added elements (alphagenous and gammagenous) in a suitable manner. It is then possible to obtain metal of satisfactory forgeability from such casts. A substantial gain in forgeability can also be obtained by forging within a carefully determined temperature range.

Gases in Metals

At the instigation of M. Calmettes, of the Société des Forges et Ateliers du Creusot, the Laboratory Engineers' Committee of the French Iron and Steel Technical Association called together representatives of steel laboratories actively engaged on the analysis of gases in ferrous metals. The object, state Miss M. Hanin and E. Jaudon, was to standardize methods of analyzing gases in metals so that the results were comparable.

The estimation of hydrogen is first considered, since it is in this connection that difficulties arising from differences in operating methods have been noticeable. There is all the more reason to go into such questions on a national basis since the Centre National de Recherches Métallurgiques, Liège Section, is proposing to arrange an International Committee on the subject.

Comparative tests have been made with sample-taking and conserving under mercury, under carbonic acid snow and acetone, and these have shown that the standard method in France, called the "notched pencil" method, is worthy of the confidence placed in it. In order to find the reason for the divergencies in the results observed from identical samples, taken under the same conditions, it has been necessary to examine the question of manufacture and calibration of the glass "dry gauge" and a McLeod type of gauge, which can be used without correction on physical analysers has been approved.

As regards oxygen, the preponderating influence of sample-taking of molten steel on the scatter of results has been shown.

Proposals for defining what should be understood by the expression "soluble nitrogen" have been submitted to the International Commission, as also for "insoluble nitrogen" and "dissolved nitrogen," according to the points of view of the metal physicist and the chemist, and an inventory has been drawn up of the various methods of analysing for nitrogen, both by purely physical as well as chemical means. A combination of these methods will probably be necessary to reconcile these points of view.

Vacuum Metallurgy

The use of the vacuum in metallurgy is fairly recent, although many physico-chemical laws associated with it, have been known for a long time. This, states D. A. Degras (Paris), is essentially due to the relatively slow development of the vacuum technique on the one hand and also to the advances made by metallurgists in respect of the requirements generally formulated a short time ago.

At low pressure, metals can be suitably degassed. It is indeed known that occluded gases can appreciably change their physical and mechanical properties. Hydrogen is soluble in copper, silver, chrome, iron, nickel, aluminium, platinum, etc., and its solubility varies as the square root of the pressure of the gas and as the temperature of the metal. With elements of noble ores and of other metals, it forms pseudo-hydrides, whereas with alkaline metals and alkaline ores, it forms true compounds.

The formation of floccules is linked with solubility, and this can vary with the different phases of the metal when its temperature varies. Nitrogen gives fairly often, metallic nitrides, and carbon monoxide is capable of forming combinations of the same type. As for oxygen, its very great chemical reactivity allows of oxides being formed alongside solutions.

Working of metals under low-pressure also allows of physico-chemical equilibrium displacement and this can be studied starting from Le Chatelier's mass effect law, when one or many gaseous phases are present. Low-pressure distillation is also used in metallurgy for refining metals or separating out alloy constituents, this being done, for example, with magnesium, lithium, calcium, aluminium and mercury.

Working in vacuum is equivalent to working protected from the contaminating agents in the atmosphere. From this angle, numerous methods devised to protect operations from the oxidizing action of the air can be enumerated such as powder metallurgy, welding, transformer sheet annealing. Finally, additions to special alloys are sometimes easier to control in vacuo than in atmospheric air. This is particularly true for additions of titanium and aluminium, which are strongly oxidizable.

Metallurgical plant for working in vacuum includes melting furnaces and heat-treatment baths. Working of metals or alloys under low pressure leads to melting in various types of furnaces, such as resistance furnaces, induction furnaces, arc furnaces, electronic furnaces. The first three types of furnace are well known as working at atmospheric pressure, but it can be conceived that, by adding a set of pumps, and making the installation air-tight, a low-pressure furnace is produced. The problem is. however, not so simple. Immediately pressures lower than a few mm. of Hg are required, the choice of materials, forming the walls surrounding the area to be evacuated, becomes specially important. The amounts of gas given off by the metal require large output pumps, which are costly, and it is important to limit as much as possible the parasite gases given off by crucibles, walls, inside controls, etc.

The technology of vacuum furnaces therefore

tends to move away from that of atmospheric pressure furnaces, all the more so as the heat losses themselves arise essentially from radiation, for which reason reflecting screens are often used, when possible and desirable, and ordinary insulators are almost excluded.

Study of the Evolution of Nitrogen in the Basic Arc Furnace

As long ago as 1932, H. W. Graham put forward nitrogen as perhaps the most objectionable element in steel because of sensitiveness to ageing and hardenability which it caused. At present, state R. Ferry and R. Lescuyer (Le Creusot), the relationship between the various states of nitrogen and the properties of steel is the subject of numerous investigations. New problems in manufacture will inevitably flow from these and, already the importance of limiting the evolution of nitrogen in molten steel in the furnace, excepting in those cases where it is specially desirable, is appreciated. The problem is studied from the special aspect of production in the basic arc furnace.

This work can be considered as a contribution and addition to what is already known in this field through the work of Takadera in particular. The main object is to provide practical and usable data for the arc furnace steelmaker. Some items are also added to help in the comparisons frequently made, from the point of view of the nitrogen content, between open-hearth and electric steels.

In accordance with the use to which a steel is to be put, nitrogen becomes either a problem of incorporation or more frequently of elimination, and it is from this point of view that this investigation must be regarded. Observations were conducted during the making of a hard steel, with 0.7 per cent. C. and a nitrogen content (N_2) limited to 100 p.p.m., made in a 15/35 ton basic arc furnace. Making was by the usual electric-melting technique: solid charge, double slagging, reduction of carbon towards 0.15/0.20 per cent., and recarburization with graphite powder, with varying methods of deoxidation. Owing to its nature and to quantity involved, amounting to more than 1,000 casts, an excellent opportunity was provided for studying the evolution of nitrogen.

Oxidizing Phase of Charge Melting.—The material charged was uniformly basic-Bessemer scrap analyzing 150 to 200 p.p.m. nitrogen. Denitriding during melting was extensive, the molten metal containing 90 p.p.m. N_2. From the start there is a relationship between the N_2 content when cast and that at melting. It is an advantage, therefore, to have as low an N_2 content as possible when melting, which means that it is advisable to introduce a protective slag from the beginning of charging and to use limestone instead of lime. If possible, scrap with a low N_2 content should be used.

Oxidizing Refining Period.—There is a definite denitriding action during refining with oxygen, this being quite large, being from 90 p.p.m. on melting to 60 p.p.m., on average. This operation tends to level out the fairly large differences sometimes obtained for the N_2 contents during melting. On the other hand, large variations in the refining process, speed and volume of decarburization, are not reflected by any notable changes in the drop in nitrogen. In current practice, decarburization of 0.400 per cent. of C. in about 1 hr. is sufficient.

Reducing Period between Refining and Tapping.—During this operation when the main operation is the delicate one of recarburizing with powdered graphite on the bare bath, the change in nitrogen is fairly small, consisting of a rise of 10 p.p.m. (N_2 before tapping: 70 p.p.m. average). This pick-up is presumably akin to the much stronger one which is observed during teeming into ladle.

Teeming into Ladle and Casting.—During teeming into ladle there is intense working between metal and slag. A systematic pick-up of nitrogen (N_2) is registered, this varying greatly from 0 to 90 p.p.m. sometimes accompanied by a small carbon pick-up. The hypothesis of nitrogen being taken from the surrounding air has been rejected as a result of experiments. The present tests have shown a definite relation between this nitrogen pick-up and the N_2 content of the slag, the latter being itself tied up with the presence of carbon in this slag. The formation under the arcs of a compound of C-N_2-Ca is quite feasible. This explanation agrees with that of Takadera and completes the older one of Schwarz. This passage of nitrogen from slag to metal is slight in the furnace but it can be activated by magnetic stirring. It obviously becomes larger during teeming into the ladle.

Given the determining action of the presence of C in the slag, it has been possible to establish a general relationship between the N_2 content of the steel and the percentage of powdered graphite, a relationship which holds good for basic arc-furnaces.

As a rule, the N_2 content of the metal in the ingot mould is identical, within a very small margin, with that of the metal in the ladle and does not vary between the beginning and the end of pouring. However if a number of well defined conditions are present, the nitrogen and carbon contents can increase simultaneously and very rapidly, particularly in the last ingots coming from metal which has been most in contact with the ladle slag. This interesting phenomenon, accidentally noticed, has been reproduced experimentally and studied. But the mechanism of the diffusion which takes place in the ladle, has still not been properly explained, although it does seem to bear some relation to the pick-up of nitrogen during tapping into the ladle.

The task of eliminating or limiting nitrogen is not an easy one, but the following steps may help: (1) use of low N_2 scrap; (2) formation of limestone slag from beginning of charging; (3) fairly heavy refining, but not overdone; (4) if possible, stop refining at a C constant near that required when casting; or, if not, limit recarburization with graphite powder and see that a good yield is obtained; (5) as a general rule cut out carburized slag; (6) avoid a too strong method of deoxidizing in the furnace; (7) deoxidization in ladle would be preferable.

New Equipment and Products

Track-mounted Drilling Rig

SELF-PROPELLED and track mounted, a new drilling rig, mounting a 4-in. or 4½-in. drifter, has been introduced by the Consolidated Pneumatic Tool Company, Limited, London, S.W.6, for completely self-contained large diameter deep hole drilling operations in open-cast mines, quarries and civil engineering works.

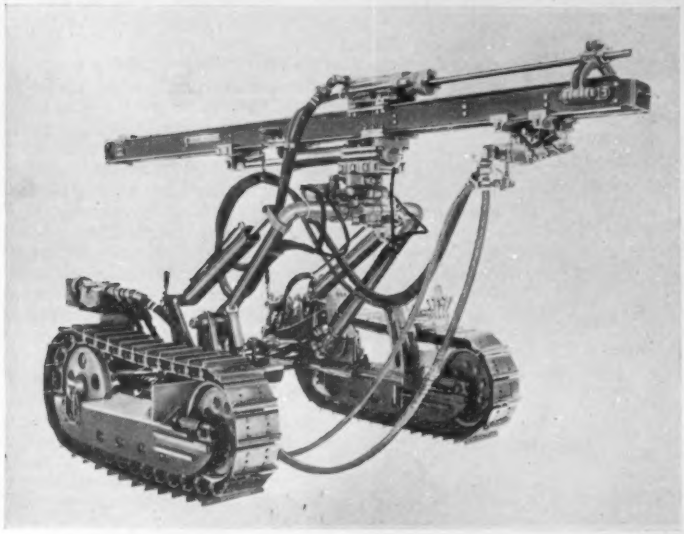


FIG. 1.—NEW CONSOLIDATED PNEUMATIC C.800 TRACDRILL.

In this unit (Fig. 1) two 6-b.h.p. "Power Vane" reversible motors provide the motive power for propelling the rig round the site at a speed of 2½ m.p.h., while towing a 365-RO-2 "Power Vane" compressor. The rig carries a drilling mast which is retracted to the horizontal position for travelling or positioned at any angle for drilling by means of hydraulic cylinders, these being operated by a large capacity air-operated hydraulic pump. The unit can also be supplied with a further pair of cylinders for inclining or swinging the drill carriage, thus reducing fatigue and making positioning fully automatic. Other features include heavy duty multiple disc brakes which eliminate movement during drilling, a throw-out clutch for towing, and a control panel indicating the drill position. The crawler control is of the spring-loaded "deadman" type and gives forward, reverse, turning and pivoting movements.

Of particular interest is the totally enclosed drive, all motor parts, brake components, clutch and drive gearings being fully enclosed to protect them from dirt and damage. To ensure efficient lubrication, a large air strainer and line oiler is fitted.

The unit has a low centre of gravity, and this, combined with independent operation of the 10-in. wide tracks, enables stability of the carriage to be maintained in rough conditions. The drill used is the CP 400 or CP 450, these being 4-in. and 4½-in. piston units, respectively.

The Tracdrill has an overall length of 86½ in., a width of 84 in. and a maximum height, with mast lowered, of 44 in. The total weight, complete with drill carriage and drill is 5,265 lb.

Testing Boiler Water

IN order to be able to prevent boiler water from becoming unduly concentrated it is advisable to have the means of estimating the chloride contents of both the feed and boiler water. The troubles caused by priming, foaming and corrosion of non-ferrous fittings can thus be avoided by blowing down in good time.

A rapid method of arriving at such an estimate is provided by the chloride testing set produced by the Paterson Engineering Company, Limited, 129, Kingsway, London, W.C.2. The feed water is tested by adding two drops of potassium chromate indicator to 70 ml. of feed water in the porcelain basin provided and then adding silver nitrate solution from a special burette until a permanent pink colour is obtained. The number of millilitres of silver nitrate used is equivalent to the concentration of chlorides as chlorine in grains per gallon and the conversion to sodium chloride is effected by multiplying this figure by 1.65.

To test the boiler water, a very small quantity such as 7 or 10 ml. is used. Two drops of phenol phthalein indicator are added and the alkalinity is neutralized by adding sulphuric acid until the colour is just discharged. The same procedure as for the feed water is then followed and the burette reading is multiplied by 10 if 7 ml. of water, or by 7 if 10 ml. of water have been used, the resultant figure representing the grains of chlorides as chlorine in one gallon of water. The chlorides in the boiler water divided by the chloride content of the feed water indicate the concentration of the boiler water.

To ascertain the approximate soluble solids content, the sample is cooled to 60 deg. F. and is thoroughly mixed before filling the hydrometer jar. A reading is then taken from the hydrometer and after correcting it for temperature variation, ascertained with the thermometer also provided, it is multiplied by 7.8, the product being grains per gallon of total solids. Thus the total soluble solids in the water can be calculated.

Worm Drive Mining Hydraulic Pumps

SPECIFICALLY developed as a mining hydraulic pump, the latest design of Joseph Evans & Sons (Wolverhampton), Limited, is a 1½- by 2-in. horizontal Triplex plunger type (Fig. 2), capable of delivering 5 or 7.5 gal./min. against pressures up to 1,500 lb./sq. in. It will handle water, water/soluble oil mixture or hydraulic oil.

The crankcase is of fabricated steel construction and fully stress relieved. It is totally enclosed with a positive lubrication system and a special design

crankcase breather ensures that dust and condensate cannot enter the crankcase. The worm drive is incorporated inside the crankcase and the crankshaft and worm shaft run in ball/roller bearings. Renewable crosshead guides are provided.

The pump block is of forged steel with hard bronze valves and renewable seats, and nitralloy pump plungers. Cast-steel stuffing boxes have self-expanding vee-type gland packings. All wearing parts are renewable and special attention in the design has been paid to accessability.

A fully flexible coupling is fitted with a heavy gauge guard. The pump will operate equally well in either direction of rotation, and a slight deviation from the horizontal will not affect the efficiency of the lubrication system. A skid-type steel baseplate accommodates pump and motor, the overall width being only 22 in.

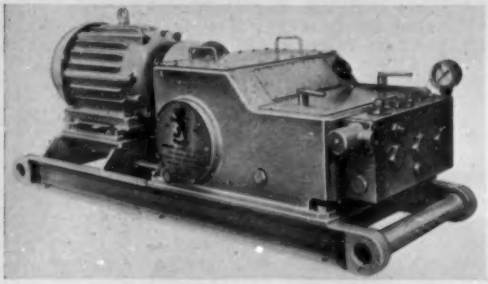


FIG. 2.—HORIZONTAL TRIPLEX PLUNGER-TYPE PUMP.

Extensible Hydraulic Link

ORIGINALLY developed by the Oil Feed Engineering Company, Limited (High-pressure Hose Division—BTR Industries, Limited), the "Hi-Flex" extensible hydraulic link (Fig. 3) is designed for use in connection with the company's flexible pressure pipes. It is hoped to meet the need for large equipment to be articulated or flexed without the disadvantages of looped hoses which might catch on obstructions.

The extensible hydraulic link consists of a tubular member capable of being expanded and contracted axially, and employs a hydraulically balanced mechanism which enables these movements to be carried out while fluid, at high pressure, is going through the appliance. The resistance to movement is low, so that little energy is absorbed when relative movement takes place between the end attachments.

In its present form the link is designed with plain tube ends, but could be produced with standard male or union ends. The standard model is adapted for ¼-in. feed lines. Its overall length extended is 18½ in. and fully retracted 15 in.—but this travel can be extended for special services. The designed maximum working pressure is 3,000 lb./sq. in. The unit is claimed to be leak-proof and will function for extended periods before replacement of seals is required. Made in mild steel and plated, the component is so designed that seals and moving parts may be easily inspected and replaced as desired.

Magnetic Drum Separator

SPECIALISTS in magnetic engineering, Rapid Magnetic Machines Limited, Birmingham, announce details of a new permanent-magnet wet-drum separator, designed to meet the requirements of the latest heavy media recovery flow sheet.

The separator incorporates a slimes overflow weir and adjustable orifice rings in tailings outlet to eliminate the need for valves. Special attention has been paid to the header box which ensures proper presentation of the feed to the drum and eliminates overloading under severe surge conditions.

Provided with expendable stainless steel outer covers, the 30-in. dia. drum, available in widths up to 72 in., is energized by a powerful Multipolar Alcomax permanent magnet unit, eliminating all electrical wiring and accessories except those necessary for the drive motor. Single-stage recovery at 80 gal./min./ft. of magnet is high under a very wide range of feed concentrations, a typical figure quoted from an actual installation being 99.6 per cent. recovery at 1.38 per cent. magnetite in feed (by weight). This represents a magnetite consumption of less than $\frac{1}{40}$ lb./ton of coal washed, based on an average of 150 gal. wash water per ton of coal.

Lightweight Welding Blowpipe

A NEW lightweight welding blowpipe now being marketed by British Oxygen Gases, Limited, should prove of value in reducing operator fatigue.

The new blowpipe is an extension to the company's range of equipment specially developed for welding sheet metal and for light welding repairs.

Known as the Lightweight Saffire, the blowpipe, completely assembled to include one of the standard range of nozzles, weighs only 9½ oz. It has forward-mounted controls for easy adjustment, and is 13¼ in. long.

The blowpipe has a new type of mixer assembly specially designed to provide a stable flame and resistance to back-fires over the whole working range. The normal range, which is covered by six nozzles, permits welding of sheet steel up to $\frac{5}{32}$ in. thick, but three additional nozzles are available for thicknesses up to $\frac{1}{16}$ in.

The nozzles are of swaged copper construction with accurate smooth internal bores produced by a special swaging process. All but the two largest sizes are 9¼ in. long, weighing 1 oz. The design of the nozzles leads to a good balance in the blowpipe and flame stability.

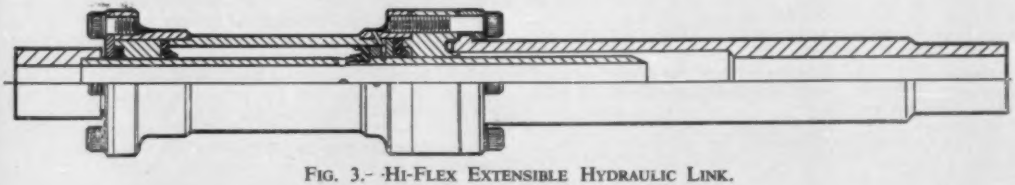


FIG. 3.—HI-FLEX EXTENSIBLE HYDRAULIC LINK.

British Iron and Steel Industry Translation Service

THE following is a list of some new translations available from the Iron and Steel Institute under its translation service scheme. Translations are all classified by numbers, and these should be quoted on application, which should be addressed to the institute at 4, Grosvenor Gardens, London, S.W.1. Further lists will appear from time to time.

KALTENECKER, H.: *How can Theory help the Control Engineer?* "Gas u. Wasserfach," 1959, July 3, pp. 681-687. £5 5s.—1449.

CONN, W. M.: *Approximating Equilibrium Conditions in the Molten Pools of Metal and Slag in Arc Welding. Example: Alumina Silica Fluxes.* "Schweissen u. Schneiden," 1958, May, pp. 174-181. £5—1468.

ROSEGGER, R.: *Technical and Mechanical Properties of differently Deoxidized Basic Converter Steels.* "Berg-u. Hütten. Monatsh.," 1958, Sept., pp. 163-175. £6—1470.

TETERIN, P. K.: *Secondary Conditions of Axial Engagement in Oblique Rolling.* "Stal," Rolling and Tube Manufacture Supplement, 1959, pp. 133-148. £2 15s.—1480.

BROVMAN, M. YA.: *Deformation of the Work Material in Cross Rolling.* "Stal," Rolling and Tube Manufacture Supplement, 1959, 22-33. £4 5s.—1456.

AWANO, T., and M. OCHIAI: *Metal Flow in Forging. (VI) High Temperature Compression Tests of Metals.* "Rep. Gov. Ind. Res. Inst. Nagoya," 1957, Sept., pp. 469-472. £9—1418.

AWANO, T. and M. OCHIAI: *Metal Flow in Forging. (V) Some Mechanical Properties of Plasticine.*" "Rep. Gov. Ind. Res. Inst. Nagoya," 1957, Jan., pp. 10-17. £9 5s.—1419.

GUTHMANN, K.: *Measuring the Dust Content in Industrial Gases and in the Air—Measurements of Dust on the Ground.* "Stahl u. Eisen," 1959, Aug., 6, pp. 1129-1141. £7—1440.

SHAO, Hsiang-Hua: *Lamination Defects in Rimming Steel Slabs.* "Acta Metallurgica Sinica" (from Chinese), 1959, Mar., pp. 16-21. £9 15s.—1445.

UNTERBERGER, M.: *Damage to Tooth Faces and the Load Capacity of Rolling Mill Gears.* "Stahl u. Eisen," 1959, Sept., 3, pp. 1268-1272. £4 10s.—1452.

PHILIBERT, J. and C. DE BEAULIEU: *Quantitative Investigation of Dendritic Segregation in Some Iron Alloys.* "Rev. Mét.," 1959, Feb., pp. 171-178. £4—1454.

FREMUNT, P. and A. LORENC: *On the Heat-treatment of Austenitic Manganese Steels.* "Slévárenství," (Prague), 1959, Aug., pp. 309-316. £6 10s.—1472.

KUNTSCHER, W., et al.: *Reactivity of Various Cokes.* "Neue Hütte," 1955, Oct., pp. 6-10. £4 5s.—1474.

FUNKE, P. sr., and P. FUNKE jr.: *Evaluating the Life of Cold Rolls.* "Stahl u. Eisen," 1959, Oct. 1, pp. 1412-1419. £5 15s.—1478.

GULYAEV, G. I., et al.: *Reducing Welded Tubes in a Three-roll Stretch Reducing Mill.* "Stal" (Rolling and Tube Manufacture Supplement, 1959), pp. 180-187. £3 5s.—1491.

BARTU, F.: *The Development of the Maerz Boelens Furnace.* Brochure from Maerz Ofenbau A.G., Zürich, 1959, June. £7—1497.

KLEMM, H.: *Segregation and Heat-resisting behaviour.* "Metall," 1959 (8), pp. 752-759. £6 10s.—1498.

KOROBOCHKIN, I. Yu., et al.: *Increasing the Life of Mandrels for Cold-tube Reducing Mills.* "Stal" (Roiling and Tube Manufacture Supplement, 1959), pp. 151-159. £3 5s.—1499.

PFAFF, W. and K. HOFFMANN: *Removal of Oxygen and Moisture from Argon, Nitrogen and Hydrogen in the Laboratory.* "Arch. Eisenhüt.," 1959, Sept., pp. 539-540. £1 5s.—1522.

OSTROUKHOV, M. Ya.: *The Influence of the Kinetics of the Coke Combustion Process on the Dimensions of the Oxidation Zone in a Blast Furnace.* "Izvest. Akad. Nauk S.S.S.R., Otd. Tekh. Nauk," 1958 (6), pp. 3-6. £3 15s.—1526.

ROHDE, W.: *Development and Present State of the Problem of the Introduction of an Automatic Coupling into the European Standard-gauge Railway Systems.* "Eisenbahn Technische Rundschau," 1959 (4), pp. 163-169. £1—1534.

Symposium on Welded Structure Fatigue

ORGANIZED jointly by the British Welding Research Association and the Engineering Department, Cambridge University, a symposium on the fatigue of welded structures is to be held in the Engineering Department, Cambridge University, from March 29 until April 1, 1960. A full discussion of the subject of fatigue of welded structures is thought to be of considerable importance at the present time.

A good deal of research has now been done, but the expansion of welding fabrication in many areas where fatigue strength is a criterion is revealing new aspects of the problem. Present knowledge might therefore be usefully consolidated and new aspects considered by those people who are directly concerned with and interested in the investigation of the fatigue of welded structures.

Papers presented will include contributions from the United States and from East Germany. These will deal primarily with structures fabricated by fusion welding processes. The fee for membership of the symposium is 15 guineas. Further particulars may be obtained from the British Welding Research Association, Abington Hall, Abington (Cambs).

Design of Welded Pipe Fittings

THE British Welding Research Association has published a new handbook, "The Design of Welded Pipe Fittings," by P. H. R. Lane and R. T. Rose. This booklet, which summarizes the work on piping components, gives details of extensive stress measurements on pipe bends, or welding elbows. Von Karman's classical method of calculating the stresses has been extended to be applicable to short-radius and thin-walled bends which have been increasingly used in recent years. The experiments have confirmed the validity of the proposed calculation.

Stress measurements on fabricated branch connections are also described. These give a rational basis for a comparison between the effectiveness of various forms of reinforcement currently in use, or which have been proposed for use. A further section deals with fatigue strength of pipe butt joints, and of various designs of end closures for model headers. From this work, important conclusions have been drawn concerning detail design of welds to attain maximum efficiency, and the importance of various classes of defect.

Future of the Open-hearth Furnace

MR. R. W. EVANS'S ADDRESS AT NEWPORT

THE great importance of the open-hearth furnace in British steelmaking has always made the question of competitive processes a highly controversial matter to discuss. It is becoming increasingly evident, however, that more and more steel will be made in this country by methods other than the open hearth in future. The problem was boldly discussed by Mr. R. W. Evans, a director of the Steel Company of Wales, Limited, at last month's meeting of the Newport and District Metallurgical Society.

Speaking on "the Basic Open Hearth, Present and Future," Mr. Evans said that with the introduction of converter processes using top-blown oxygen such as the LD process into this country, one was bound to say that it was very unlikely that many more large open-hearth furnaces would be put in any integrated steelworks. The Americans, he pointed out, were of this opinion also, and it was significant that no open-hearth plant was envisaged at the new integrated steelworks about to be built by Richard Thomas & Baldwins, Limited, at Llanwern, near Newport.

"The open hearth is now fighting for its life," he declared. "But there is a great deal of capital wrapped up in the open hearth and these furnaces have got to see their life out. They have got to be made efficient to compete with the top-blown oxygen converter processes."

History and Development

Mr. Evans began his address by tracing the history and development of the open hearth, comparing the early Siemens furnace with the modern 350-ton capacity American furnaces. Nowadays, he said, a 500-ton capacity furnace was by no means out of the question and the Russians had just published details of an 800-ton furnace.

One of the obvious advantages of converter steelmaking over open hearth was the question of cost. Mr. Evans estimated that for equivalent capacities, a top-blown oxygen converter plant would cost not more than two-thirds of the cost of an open-hearth plant for installation; the converter took up far less space and had a rate of production with which the open hearth could not compete. "I'm afraid the converter has all the aces," he added.

With oxygen injection into the open hearth the cost differential might be reduced, but he thought it extremely unlikely that open-hearth plants could be put down for the same cost as converters. The quality of LD steel now compared in every way with open hearth and he thought the future pattern would be top-blown converters combined, perhaps, with one or two small electric furnaces.

In answer to a question by Dr. Bryn Jones (Whitehead Iron & Steel Company, Limited), Mr. Evans said that an open-hearth furnace should meet a certain number of heats a week, irrespective of the size of the furnace. A 500-ton furnace should make the same number of heats as a 50-ton furnace. The bigger the furnace the cheaper it was to operate. But already 200-ton converters were being planned which would make steel at a tremendous rate. This represented a rapid advance on the 15- to 20-ton converters that were started with only a few years ago. The ultimate capacity of an LD or similar converter was, said Mr. Evans, an engineering matter.

Mr. T. Grey-Davies, secretary of the society, said that members would reluctantly have to agree that LD would supersede the open hearth but he wondered if Mr. Evans could visualize anything beyond oxygen which might be introduced to further improve the performance of open hearth. Mr. Evans replied, "I am not sure that the application of oxygen on a large scale is really not the end of the picture. I don't think I shall see any more than the very rapid application of oxygen in wide furnaces built to withstand intense temperatures."

Mr. Norman Gray (Guest Keen Iron & Steel Company, Limited), said the converter was a much more logical way to make steel than the open hearth. He thought the future of the steel industry, after the present open-hearth furnaces had worked out their lives, lay in top blown converters with open-hearth or electric furnaces as auxiliary plant.

In answer to Mr. H. H. Stanley (Steel Company of Wales, Limited, Newport), chairman of the society, Mr. Evans said a number of the existing open-hearth furnaces would last a good many years yet but he very much doubted whether a fully integrated works would in future put down open-hearth plant. It was more likely that surplus scrap would be used in electric rather than open-hearth furnaces.

Mr. Evans was thanked for his address by Mr. Grey-Davies and Mr. J. Wright (Guest Keen & Nettlefolds, Cwmbran).

Album of Indian Art

A 1960 wall calendar just issued by the Tata Iron & Steel Company, Limited, takes the form of an album of paintings by contemporary Indian artists. A brief biographical note is included on each of the 12 painters concerned.

Coalfield News

Tyne Coal Trade in 1959

LAST year's shipments of coal and coke from the river Tyne were the poorest since 1945, when the trade was still recovering from the effects of the war. Total shipments were 5,739,504 tons, 924,374 tons fewer than in 1958. Export cargoes were slightly better than the previous year at 759,804 (758,527) tons, but coastwise trade with London and other ports declined by 925,651 tons to 4,979,700 tons.

In the early months of 1959 shipments were so poor that it was anticipated that the year's total would show a deficit of about 1,000,000 tons on the 1958 total. Since the last war the Tyne's annual trade increased to nearly 9,500,000 tons in 1950. It remained in that region for some three years and has since been declining steadily. In the years immediately before the last war shipments averaged over 12,000,000 tons. The record total was in 1913, when 21,500,000 tons left the river.

AFTER BEING on strike for nearly two weeks 40 engineers at the NCB's steel reclamation centre at Carcroft, near Doncaster, went back to work on Monday. The strike was over a wages dispute.

OVERALL PRODUCTIVITY in the Durham Division of the NCB in 1959 averaged 21.37 cwt. per manshift, against 20.68 cwt. in 1958. The figures for faceworkers were 62.67 cwt. and 60.09 cwt., respectively.

SOME 320 MEN will be affected when Cowdenbeath No. 7 Colliery (Fife) closes down on January 29. The men will be absorbed at other pits in west Fife. A certain number will be retained for salvage work.

THE CHANGEOVER to diesel traction on the railways has meant that about 180 men will lose their jobs when the NCB closes two manufactured fuel plants in South Wales. They are the Felinfran plant, Clydach, Swansea, and the Crown patent fuel works at Cardiff.

DURING 1959, coal shipments from the Hartlepools (Co. Durham) amounted to 1,713,940 tons, compared with 2,012,488 tons in 1958. There was also a reduction of 227,000 tons in iron-ore imports, but it is expected that this trade will recover this year.

TALKS BETWEEN union officials at the colliery and the colliery manager, Mr. Joseph Hogan, took place at Greenrigg Colliery (West Lothian) on Wednesday of last week. They discussed the plans for the colliery's closure which will take place in two stages over the next four months. It employs 504 men.

IN A PLEBISCITE, 90 out of 150 Berwick-on-Tweed miners have voted in favour of the NCB licence which was granted to Cllr. Gavin Drummond for the starting of a drift mine being handed over to Berwick Defence Committee, an association of miners and townspeople. Details will be presented to Viscount Lambton, MP for Berwick.

AMBLE (NORTHUMBERLAND) Urban Council has expressed concern about falling coal shipments from Amble Harbour. In the six months ended December, shipments were 70,000 tons less than in the corresponding period of 1958. Much of the Shilbottle Colliery coal, formerly shipped from Amble, is now being sent to Blyth, and most of Amble's present coal trade is now with Scottish ports.

THERE WERE LARGER SHIPMENTS of coal and coke from the South Wales ports last week, a total of 60,715 tons comparing with 53,036 tons in the previous week and 60,369 tons in the corresponding week of 1959. Shipments from the various ports (with last year's comparable figures in parentheses) are as follow:—Newport, 13,533 (6,483) tons; Cardiff, 8,216 (7,914) tons; Penarth, 2,071 (6,277) tons; Barry, 16,225 (14,759) tons; Port Talbot, 1,059 (2,513) tons; Swansea, 19,611 (22,423) tons.

TRANSFER OF MEN FROM Dearne Valley Colliery to Houghton Main Colliery in the Yorkshire coalfield will start in the first week of February, it was stated at a meeting of the Dearne Valley branch of the NUM at Great Houghton on Saturday. Mr. E. Hedley, agent for the two collieries, said he hoped to put all Dearne Valley men together at Houghton Main and none would suffer financially or be down-graded.

Proposed Merger of Reyrolle and Parsons

JOINT statement issued by A. Reyrolle & Company, Limited, electrical engineers and switchgear manufacturers, of Hebburn (Co. Durham), and C. A. Parsons & Company, Limited, engineers and makers of turbines and turbo-electric generators, etc., of Newcastle-upon-Tyne, reveals that a merger of the two companies is planned. Some form of integration is felt to be in the best interests of stockholders.

Although Reyrolle holds 40 per cent. of the Parsons' equity, there are technical legal difficulties in a closer association and counsel's opinion is being sought. A merger would create a group with total assets of some £55,000,000 and net current assets of around £27,000,000.

Under the scheme proposed a holding company would be set up to take over the share capitals of both companies, but they would continue to trade as separate entities with their own managements and present works. It is stated that the proposed integration would strengthen the existing commercial and technical collaboration and take advantage to the fullest extent of the diversity of products of the two companies, providing at the same time the benefits and economies of a unified organization.

Both companies are interested in atomic energy and are members of the Nuclear Power Group, Limited, the consortium which is building nuclear power stations at Bradwell (Essex), Berkeley (Glos), and Latina (Italy).

Darwins Group to Raise More Capital

EXPANDING demand for the products of the Darwins, Limited, Sheffield, group of steelmakers, etc., has created a need for some £200,000 for new capital equipment and another £100,000 to finance larger stocks, particularly high-speed steels and work in progress. Accordingly, the board announces a rights issue to raise just over £300,000.

The issue will consist of 401,500 10s. ordinary shares at 15s. 6d. each on a one-for-four basis to holders of January 9. The creation of 1,100,000 10s. ordinary shares will be proposed at an extra-ordinary meeting on January 28, provisional allotment letters being sent out on the following day.

"Substantially higher" group consolidated profits are expected for 1959 and the prospects for this year are "encouraging." The directors expect to follow the 4 per cent. 1959 interim with a final dividend of 8½ per cent. for which, of course, the new capital does not rank.

Coal Output is Contracting

Effective Economy Measures

CONTRACTION in the coal-mining industry and the economy measures taken progressively throughout 1959 are reflected in the comparative percentages for the year and for last week's output. For the whole of 1959 deep-mined output dropped by 3 per cent. compared with 1958; it is now almost 4 per cent. less than a year ago. Open-cast output for the year was 32 per cent. down; last week it was about 27 per cent. down. Total output last year was 4.5 per cent. down on 1958. Last week it was 5 per cent. less. Allied with other factors it would appear that action taken is proving strikingly effective.

One of the other factors referred to is output per manshift, which reached 77.22 cwt. at the face for the week ended January 2, compared with 72.44 cwt. a year ago and an average of 74.58 cwt. for 1959 and 70.38 cwt. for 1958.

Voluntary absenteeism was reduced last year to an average of 5.95 per cent., compared with 6.41 per cent. for 1958.

Coal consumption continues well ahead of production, a satisfactory state of affairs, which means that inroads are made into undistributed stocks. Reluctance to replenish stocks added to the seasonal slackness for the week after Christmas is shown in the drop of nearly 400,000 tons in distributed stocks, which now stand at 14,352,000 tons. Undistributed stocks fell by about 300,000 tons, giving one of the biggest falls in total stocks—688,000 tons—recorded for a long time.

There were 640,200 wage-earners on colliery books on January 2, against 687,500 on January 3, 1959, the numbers engaged at the coal face being 247,600 and 270,700, respectively. Total absenteeism (all workers) in the week ended January 2, was 22.55 per cent., compared with 22.90 per cent. in the week ended January 3, 1959. Output at the face was 3.861 tons and overall 1.307 in the week ended January 2, compared with 3.622 and 1.253 in the week ended January 3, 1959.

The following table gives (in tons) the output of saleable mined coal by Division in the week ended January 9, and the tonnage lost through all causes (holidays, disputes, and go-slows):—

Division.	Week ended January 9, 1960.		Week ended January 10, 1959.
	Total output.	Tonnage lost.	Total output.
Scottish	356,400	3,200	362,100
Northern (N & C) ..	230,500	300	253,400
Durham	449,500	—	466,300
North-Eastern ..	865,400	4,000	885,100
North-Western ..	264,400	100	298,000
East Midlands ..	915,500	—	941,100
West Midlands ..	303,700	2,000	328,800
South-Western ..	413,700	5,100	431,600
South-Eastern ..	34,400	—	35,400
Great Britain—			
Deep-mined coal ..	3,833,500	14,700	4,001,800
Open-cast coal ..	153,300	—	210,400
TOTAL	3,986,800	14,700	4,212,200

North-East Mining Retirements

TWO north-east mining men, each with nearly half a century of service in the industry, are retiring from posts with the Durham Divisional Coal Board. They are Mr. J. F. Gibson, deputy Area general manager of the No. 6 (North-West Durham) Area, who leaves at the end of the month, and Mr. M. Greener, who has been engaged on specialist mining duties.

Mr. Gibson entered the mining industry in 1911. After three years as an apprentice surveyor with the Ashington Coal Company, Limited, Newcastle-upon-Tyne, he commenced a mining apprenticeship with the Lambton Hetton & Joicey Collieries, Limited, Newcastle. After serving in the 1914-18 war, he completed his mining training and was appointed manager of West Pelton Colliery, becoming agent for the Joicey Group of collieries in 1945. Mr. Gibson was appointed deputy Area general manager, No. 6 Area, at vesting date.

Mr. Greener started in 1912 as an apprentice with Pease & Partners, Limited, Darlington. After a further period of apprenticeship with John Bowes & Partners, Limited, at Marley Hill Colliery, he served in the 1914-18 war. On completing his apprenticeship, he became assistant manager and then manager of South Moor Colliery. In 1926 Mr. Greener became mining agent for Strakers & Love, Limited, Newcastle, and at the same time was a director of their Brancepeth Gas & Coke Company, Limited, and also acted as general manager of the Standard Pulverized Fuel Company, Limited. At vesting date he was appointed Area general manager, No. 5 Area.

Atlas Copco Expands in Africa

ATLAS COPCO, the international group of compressed air engineers, has recently merged its northern and southern Rhodesian companies into one concern under the title of Atlas Copco Rhodesia (Pvt.), Limited. At a party to mark the opening of the new premises, Mr. Peter Wallenberg, managing director of the new company, said that the head office had been established at Salisbury, capital of the Federation of Rhodesia and Nyasaland, with fully-equipped branches at Bulawayo, Lusaka, and Ndola, to strengthen the company's position in the federation and to provide a wider and more comprehensive service.

With an investment of over £250,000 already in the Federation, it is proposed to extend Atlas Copco activities into Nyasaland.

Personal

Dr. J. G. Pearce to Advise Union Carbide

TO work in collaboration with Dr. A. M. Sage and his team in their development programme, Dr. J. G. PEARCE, who retired as director of the British Cast Iron Research Association at the end of 1958, has been appointed a consultant to the alloys division of Union Carbide, Limited, London, W.1.

A graduate of Birmingham University, Dr. Pearce became director of BCIRA in 1924. His reputation in the field of ironfounding is international and he was awarded an honorary doctorate (D.Ing.) of the University of Aachen in 1948. He was active in promoting the British Foundry School, which came into being in 1935 and was later reconstituted as the National Foundry College.

Mr. G. V. JONES, who was formerly with A.P.V. Paramount Company, Limited, Crawley (Sussex), has joined the development department of the alloys division of Union Carbide. His main concern will be the developments associated with the cast iron industry.

Mr. G. E. BEHARRELL, chairman of the Dunlop Rubber Company, Limited, has resigned from the board of the North British Mercantile Insurance Company, Limited.

Sgr. MALVESTITI, president of the High Authority of the European Coal and Steel Community, who was to have visited the Ruhr coalfield on Thursday and Friday of next week, has postponed his visit for a month. His aim is to look into the reorganized central coal marketing organization which is planned by coal producers.

Mr. H. M. S. MILLER, technical development supervisor at the Bord ña Mona experimental station, and Mr. E. REDEHAN, chief civil engineer at the board's head office, have gone to Pakistan, where they will advise on the exploitation of the country's peat bogs. Their findings and Bord ña Mona's experience in development work will be the subject of a special report submitted to the Pakistan Government.

Six executives of Henry Simon, Limited, flour and provender milling engineers, etc., of Stockport, have retired with a total of more than 200 years' service between them. Each has been presented with a cheque. They are:—Mr. J. S. BALL, chief development engineer (40 years); Maj. F. M. HAHN, senior engineer on the advisory staff (40 years); Mr. K. E. MESSMER, manager of the general goods department (45 years); Mr. T. S. PARKER, technical manager, milling department (18 years); Mr. E. SWALES, northern representative (44 years), and Mr. N. WILKINSON, chief erector (27 years).

The Minister of Power, Mr. RICHARD WOOD, is to spend the greater part of next week in Northumberland and Durham in his tour of coalfields and other important industrial centres. He will meet members of the Northern (N&C) and Durham Divisional Coal Boards and have discussions with the NUM and other representative bodies. On Monday the Minister will be in the Blyth and Ashington districts, while on Tuesday Mr. Wood will visit the Rising Sun Colliery, Wallsend, before going on to the Dudley, Seghill, and Seaton Delaval collieries and Blyth harbour. On the following morning he will be at Blackburn Fell Drift, Morrison Busty training centre, and Beamish Mary Colliery. After a visit to the Lackenby steelworks of Dorman, Long (Steel), Limited, on Thursday morning Mr. Wood, accompanied by his wife, will go underground at Easington Colliery. Last week, at Manvers Main Colliery (Yorks), Mr. Wood went underground for the first time.

All-time Steel Record for December

HIGHEST average weekly rate of steel production for any December was achieved last month, according to the Iron and Steel Board's production statement issued yesterday (Thursday). At 432,900 tons, it was 38 per cent. higher than the rate for December, 1958. In the first three weeks of the month, when output was not affected by holidays, it averaged 474,300 tons a week, or 3.4 per cent. higher than in November, and continues the monthly increase in production of between 3 and 4 per cent. which began in October.

Pig-iron output in December, although affected by the holidays, averaged 280,400 tons a week, slightly less than the record level of 285,500 tons reached in October, 1957, but considerably above the December, 1958, rate of 223,100 tons.

Steel output for 1959 totalled 20,200,000 tons, compared with 19,600,000 tons in 1958, which, however, was a 53-week year. It is currently running at about 23,500,000 tons a year. Total output of pig-iron for the year was 12,600,000, compared with 13,000,000 tons in 1958, and was obtained from a smaller number of furnaces.

Latest pig-iron and steel output figures (in tons), with the corresponding 1958 returns, are shown in the following table:—

Period.	Pig-iron.		Steel ingots and castings.	
	Weekly average.	Annual rate.	Weekly average.	Annual rate.
1959—November ..	277,300	14,422,000	458,600	23,847,000
December ..	280,400	14,583,000	432,900	22,513,000
Year ..	—	12,582,000	—	20,186,000
1958—November ..	233,700	12,155,000	351,900	18,299,000
December ..	223,100	11,602,000	313,100	16,282,000
Year ..	—	12,975,000*	—	19,566,000*

* 53-week year.

Anglo-US Crane Agreement

UNDER an agreement between Steel & Company, Limited, Sunderland, and the Unit Crane & Shovel Corporation, Milwaukee, USA, the American firm will manufacture Coles cranes and market them throughout the US, Canada, and Mexico under the name of Unit-Coles. R. H. Neal & Company, Limited, London, W.5, will manufacture Unit cranes, excavators, draglines, and backhoes at its Grantham factory and market them throughout the world, with the exception of the US, Canada, and Mexico, under the name of Neal-Unit, subject to the existing franchises in Australia, the Union of South Africa, and the Benelux countries.

A sales company has been registered under the name International Crane & Excavator Corporation with headquarters in New York for marketing Coles cranes and Unit cranes and excavators in the south and central American republics.

THE COAL TRADE

SHORTAGE of mineral trains experienced in some areas in recent times would appear to have eased to some extent and despatches from collieries have improved as a result. Demand for household fuel has become much brisker with the cold weather. On the industrial side, deliveries to works have been stepped up following the quiet spell caused by the New Year holidays.

SOUTH WALES AND MONMOUTHSHIRE

Cardiff—New business proceeds at a quiet pace in South Wales, where output improvement still lags. Household trade is fairly active, but apart from a few special grades there is no lack of supply. Brisk demand passes for anthracite and special central-heating grades, which continue in limited supply. Cokes are firm, but patent fuels are slow and works are to close down in Cardiff for want of trade.

Export trade is lifeless, with odd business with the Mediterranean markets and a slow shipment to France and Belgium.

Provisional figures show that South Wales produced just over 20,000,000 tons last year, a decline of about 1,500,000 tons compared with 1958. It was the smallest output since 1879.

Swansea—House coal demand has increased considerably with the colder weather and merchants are now fully employed. Supplies from the collieries are maintained at a reasonable level, although a shortage of Group 3 coals is reported from some sidings.

Newport—House coals are active and there is a little more doing in industrial grades, but Monmouthshire coals generally could do with much more business. There is a limited export trade going on.

Coal Chartering

IN common with other areas, the coal market from Hampton Roads is quiet and, although there is interest to certain destinations, charterers are content to await developments and to some extent owners' reactions. Nothing is reported from the Roads to the Continent, as apart from the possibility of one or two relet cargoes nothing is quoting. On the other hand, interest is maintained to Japan, with 12,000 tons fixing for January at $8.35 and 11,000 tons for February/March at $8.40.

Rather more interest is noted on South American account, with 9,500 tons fixing to Rio for January at $5.50; also 11,500 tons for January/February at this rate, and to the Lower Plate, 7,500 tons to Buenos Aires at $5.75, January shipment. Mobile/Santos paid $6.00 for 9,500 tons, January. Hampton Roads/Trieste took prompt tonnage at $5.95.

Further chartering is reported from Gdynia or Gdansk to Buenos Aires or La Plata, three vessels having been fixed for February and February/March positions, all at 38s. There is a small miscellaneous inquiry from the UK, with Wales/West Italy fixing 4,000 tons for early February at 26s., and 31s. has been paid Wales/Bizerta for 3,150 tons spot/prompt. Blyth/Madeira fixed about 5,500 tons for first half February at 23s. 3d.

R. HOE & COMPANY, LIMITED—Mr. T. L. Turner, sales director, has retired after 46 years with the company, which is a subsidiary of R. W. Crabtree & Sons, Limited.

Coal Stocks Position

DETAILS of coal stocks as at January 2, 1960, compared with those available at January 3, 1959, are given in the appended table issued by the Ministry of Power.

Figures in parentheses, mainly calculated on the basis of requirements during the winter, indicate the total weeks which the tonnage in stock would last.

Week ended:—	Jan. 2, 1960.	Jan. 3, 1959.
	Thous. tons.	Thous. tons.
Distributed stocks—		
Public-utility undertakings—		
Gas	2,228 (4.2)	2,826 (5.3)
Electricity	6,153 (5.5)	7,405 (7 0)
Railways	530 (2.6)	695 (3 3)
Coke ovens	1,194 (2.3)	1,265 (2.6)
Industrial consumers—*		
Iron and steel	227 (2.0)	250 (2.2)
Engineering and other metal industries	281 (3.1)	331 (3 7)
Other industries	1,578 (2.8)	1,927 (3.4)
TOTAL INDUSTRIES	2,086	2,508
Merchants' stocks—		
(*a*) House coal	1,564	1,802
(*b*) Anthracite and boiler fuel	204	144
Miscellaneous (estimated)	393	479
TOTAL DISTRIBUTED STOCKS	14,352	17,124
Undistributed stocks—		
At collieries (on ground and in wagons)	28,979	13,599
At open-cast sites	6,879	5,890
TOTAL UNDISTRIBUTED STOCKS	35,858	19,489
TOTAL DISTRIBUTED AND UNDISTRIBUTED STOCKS	50,210	36,613

* Excluding stocks held by the smaller consumers of less than 1,000 tons per annum.

AFTER 50 YEARS in the mining industry, during which time he has been a pony driver, a haulage hand, a face-worker, a ripper, and a road repairer, Mr. Enoch Mason, who has been at Apedale Colliery (Staffs) for the past 12 years, has retired. He has received presentations to mark his long service in Staffs collieries.

THE CLINIC FOR the treatment of nystagmus—the disease caused by bad lighting in the mines—in the North-Eastern Division of the NCB is to be closed because of the fall in the incidence of the disease. Among Yorkshire's 128,000 miners there were only five reported cases last year. Some 30 years ago there were hundreds of cases of the disease in Yorkshire every year.

Appointments

From Junior to Senior Board

TWICE a member of the junior board of Crompton Parkinson, Limited, manufacturing electrical engineers, of Guiseley (Yorks)—as chairman on both occasions—Mr. A. E. GREGG has been appointed a director and general manager of Crompton Parkinson (Chelmsford), Limited.

MR. A. E. GREGG

Mr. Gregg has been with the Crompton Parkinson group since 1936 and for the past year has been general manager at the group's Guiseley works. Prior to that he was product manager for motors at Guiseley and he was also general manager of the oversea works division, in which capacity he travelled extensively in the Commonwealth and North America, visiting the group's manufacturing plants.

Mr. A. V. Sowman, managing director of Crompton Parkinson (Chelmsford), remains in that capacity.

Mr. G. L. KNIGHT has been appointed assistant to the director of the Scientific Instrument Manufacturers' Association of Great Britain.

Mr. D. G. GILL-DAVIES has been appointed export sales manager and Mr. D. W. SMITH, assistant export sales manager of Firth-Vickers Stainless Steels, Limited, Sheffield.

Mr. G. ISSERLIS has been appointed senior lecturer in charge of the division of metal science of the Borough Polytechnic, London, S.E.1, and Mr. S. N. HOULDSWORTH has been appointed lecturer in chemical engineering.

Mr. H. H. E. GEORGEL has been appointed contracting division manager of the Consolidated Pneumatic Tool Company, Limited, London, S.W.6, in succession to Mr. H. H. Hicks, who has relinquished the post after 30 years with the company.

Mr. EDWIN E. HEWETT has been appointed a sales engineer of Nash & Thompson, Limited, engineers, of Tolworth, Surbiton (Surrey). He was previously a specialist in ultrasonic flow detection techniques with Cossor Instruments, Limited, London, N.5.

The West Midlands Divisional Coal Board has appointed Mr. C. CORKE to be mechanical engineer at Mossfield Colliery (Staffs), in succession to Mr. D. M. Tudor, who has retired. He has been mechanical engineer at Berry Hill Colliery (Glos) since 1953.

Mr. W. B. WRAGGE has been appointed managing director of the Exors. of James Mills, Limited, steel rollers and manufacturers of bright steel bars, etc., of Woodley, near Stockport, and Bredbury Mills, Limited, both subsidiaries of the Guest Keen & Nettlefolds, Limited, group.

A group director of research has been appointed by the Pressed Steel Company, Limited, Cowley, Oxford. He is Mr. JOHN L. LUTYENS, who will have a seat on the company's motor-car body divisional board. Mr. Lutyens, who is 42, began his industrial career in 1946 with the Aluminium Union, Limited, and joined the British United Shoe Machinery Company, Limited, Leicester, in 1948. He became director of research and recently resigned from the board of that company.

Mr. ALEX. DORMER, chairman and joint managing director of the Sheffield Twist Drill & Steel Company, Limited, has been appointed second vice-chairman of the Gauge and Tool Makers' Association to fill the vacancy caused by the death of Mr. H. G. Carmichael Wilson.

Mr. J. E. A. HEALE, formerly works manager of the Motherwell works of Metropolitan-Vickers Electrical Company, Limited (now A.E.I. (Manchester), Limited), has joined Associated Electrical Industries (Woolwich), Limited, as general manager of works. His successor at Motherwell is Mr. E. CAMPBELL.

Mr. A. CUSINS has been appointed manager of the London office of Belliss & Morcom, Limited, manufacturers of steam turbines, diesel engines, etc., of Birmingham, as from February 1. For a considerable number of years he has been closely associated with business in the Middle and Far East.

Mr. L. W. NOBLE, former manager of the North Shields branch works of Cockburns, Limited, engineers, valve and spring makers, etc., of Glasgow, has become manager of the London office. Mr. W. A. DUCKWORTH has been appointed manager of a new office in Manchester which has been opened by Cockburns to serve, in particular, the chemical processing industry.

Mr. J. S. PERKS, previously assistant manager, has been appointed manager of the foundry plant division of the Incandescent Heat Company, Limited, Smethwick, Birmingham. He succeeds Mr. P. M. Williams, who has relinquished the position on being appointed to the executive board. Mr. Perks, who has been with the company for the past five years, will be assisted by Mr. M. JURKOWSKI.

Mr. S. G. P. DE LANGE, who spent 23 years in Britain with Philips Electrical, Limited, London, W.C.2, has been appointed commercial co-ordinator with the Nellen's Machinefabriek, Constructie-werkplaats and Technisch Bureau NV, Rotterdam. During his years with Philips Electrical, from which he retired last year, he was for a considerable time commercial manager of the industrial products division. In his new appointment his task will be to extend his firm's share of world markets in technical products.

Mr. A. W. MCGILLIVRAY, assistant Area general manager, No. 5 Area, of the Durham Divisional Coal Board, has been appointed assistant Area general manager of No. 6 Area of the Division on the retirement of Mr. J. F. Gibson, deputy general manager of the Area. Mr. McGillivray began his career with the Coal Board before vesting date, working in the board's London office in 1946. He was Area chief accountant in No. 6 Area of the Durham Division until taking up his post in No. 5 Area in 1955. He is 52.

Mr. T. JOHNSON, Area manpower officer of the No. 5 Area of the Durham Divisional Coal Board, has been appointed Area industrial relations officer, No. 5 Area, in succession to Mr. J. F. McAninly, who was recently appointed deputy industrial relations director of the Durham Division. Mr. Johnson, who is 58, was employed for many years at Sacriston Colliery (Co. Durham). From 1942 to 1947 he served as a member of the labour department staff of the Ministry of Fuel and Power and since then has held the post of Area welfare officer and Area manpower officer, No. 5 Area.

IRON AND STEEL TRADE

A GOOD start has been made by the steel industry with its self-assumed task of raising ingot production this year to 20 per cent. more than last year's output. Apart from sheets, no shortages are apprehended. Capacity will steadily increase as the year advances. It is intimated, for example, that the new plate mill now being erected by the South Durham Steel & Iron Company at Greatham is expected to begin operating in November, and other development schemes elsewhere being in process of acceleration, adequate provision has apparently been made to keep pace with the exceptionally heavy demands of the principal steel-using industries.

Pig-iron

Pig-iron statistics present a remarkable anomaly. Production has risen very considerably, yet there are fewer blast furnaces working than there were a year ago. The simple explanation is that several obsolete blast furnaces of small capacity have ceased working, while evolutionary changes in modern blast-furnace practice and the beneficiation of ore have made it possible, as Sir Walter Benton Jones has just revealed, to make twice as much iron as was possible 10 years ago in furnaces of modern design.

Merchant iron for the foundries is moving into consumption a little more freely, but supplies are ample, and export sales continue.

Ferro-alloys

There has been an increase in the price of ferro-tungsten of 3d. per lb., the new price being 11s. 10d. per lb. W contained. Tungsten metal powder is now 14s. 10d. per lb. Slightly more activity is reported in ferro-tungsten, while ferro-vanadium and ferro-molybdenum are quite active.

The demand for both the 45 per cent. Si and 75 per cent. Si grades of ferro-silicon is at a good level, but silicon metal shows only slight improvement. Steady interest is maintained in ferro-chrome, and ferro-manganese and calcium silicide are moderately supported. Ferro-titanium is fairly active. Steady attention is given to ferro-niobium. Chromium metal is in fair demand.

Semi-finished Steel

The improvement in the semi-finished steel trade is well maintained. Re-rollers are working very close to the limits of their capacity and, having substantial programmes for the first quarter, they are taking up unusually large tonnages of semis in the form of billets, blooms, and slabs.

Steelmakers, in turn, are making a good response to the increased requirements of their customers, but there is no margin between supply and demand.

Finished Steel

Fortified with a substantial volume of orders in hand which ensures a busy first quarter of the year, steelmakers are concentrating closest attention upon the behaviour of the market for heavy steel products. The market has certainly improved and some of the mills are now working 17 shifts a week, but it is not yet possible to determine how much of the demand is due to re-stocking and how much of this material is passing into direct use.

Current opinion is that capital investment works will continue to absorb larger tonnages as the year advances, but optimism is restrained by the continued slackness of demand from the railways, collieries, and shipyards, which normally provide substantial outlets for the disposal of the heavier types of finished steel.

South Wales Ports' Trade in 1959

IMPROVEMENT in trade through the South Wales ports in December gave more excuse for optimism than the returns for the year. Imports and exports last month were 9,012 tons up at 1,268,991 tons, compared with December, 1958, but over the year trade has declined by 670,974 tons to 16,554,981 tons. The decline was entirely in exports and was too great to counterbalance the improvement of 345,246 tons in imports.

Increases in imports were considerable for iron ore which rose by 298,000 tons to 4,069,000 tons and non-ferrous ores which were up by 32,000 tons to 258,301 tons. Iron and steel arrivals fell 131,000 tons to 157,721 tons and pitwood and mining timber by 48,000 tons to 192,220 tons.

Practically all the reduction in exports was accounted for by the coal, coke, and patent fuel outgoings, shipments dropping by nearly 1,000,000 tons to 2,753,404 tons. Of this total only 1,198,807 tons went to foreign destinations, compared with 1,766,723 tons in 1958. Export trade in iron and steel goods went up by 168,000 tons to 563,357 tons and tinplate shipments by 39,000 tons to 475,096 tons.

The 1959 tonnages through the seven ports (1958 figures in parentheses) were as follow:—Newport, 2,276,631 (2,448,458) tons; Cardiff, 2,262,358 (2,105,907) tons; Barry, 1,231,371 (1,742,472) tons; Port Talbot, 2,865,733 (2,521,431) tons; Swansea, 7,502,395 (7,967,400) tons; Penarth, 390,896 (422,972) tons; Lydney, 25,597 (35,315) tons.

Promising Outlook for Midland Iron & Hardware

PROVIDED the more favourable trading conditions continue, Mr. G. A. Ryland, chairman of the Midland Iron & Hardware Company (Cradley Heath), Limited, Cradley Heath (Staffs), has confidence that the coming year will again produce satisfactory results. He reports that the improvement in the latter part of the year ended July 31, 1959, has so far, broadly speaking, been maintained.

The company, he says, is in an exceptionally sound position for acquiring new subsidiaries as favourable opportunities arise and also for carrying out any contemplated extensions.

Group net profits fell to £129,356 (£135,335). The Unicone Company, Limited, Glasgow, was affected by a restriction of NCB orders and trading conditions were difficult in the earlier part of the year. The chairman states, however, that trading results proved much better than was anticipated.

Will Inflation Follow US Steel Strike Settlement?

WITH the ending of the US steel dispute the menace of inflation now rears its head and it is widely felt that both labour and management must seek to offset the increase in wages and fringe benefits by higher productivity. This is probably wishful thinking in the light of estimates that the cost of the settlement over the next two and a half years will be more per ton of steel than the companies now make as profit.

Mr. Mitchell, US Secretary of Labour, is optimistic enough to believe not only that the country has possibly seen its last major steel strike, but that the terms he and Vice-President Nixon negotiated with the steel companies and the union are not inflationary. The Bankers Trust Company of New York, however, takes a more realistic attitude. The total cost of the agreement, it points out, is 41 cents and on an annual basis this is calculated to exceed the industry's normal productivity. Moreover, the companies have lost their fight for greater control over local working conditions and practices, thereby reducing the possibilities for improving efficiency. The steel settlement is also likely to become the pattern for wage agreements in other important industries.

Furthermore, since it is generally considered almost a certainty that steel prices will be raised some time later on in the year anticipatory and speculative buying and ordering will be encouraged, thereby adding to inflationary pressures.

Steel production for the current week in the US is estimated at 2,700,000 tons, equal to 95.3 per cent. of capacity, the American Iron and Steel Institute reports. This figure, which is based on a capacity of 148,500,000 tons at the start of this year, shows no change on the previous week.

CHANGING PATTERN OF DEMAND

NEW methods and technical advances provided reasons why many once-prosperous industries were now contracting or even dying, said Mr. John H. Osborn, MP, speaking at a meeting of the Sheffield branch of the Incorporated Sales Managers' Association on Thursday of last week. Mr. Osborn, who is a director of Samuel Osborn & Company, Limited, the Sheffield steelmakers, said that holes had not to be drilled in metal to the same extent now as 10 or 15 years ago and there was therefore a changing pattern in demand in the manufacture of twist drills. There were new techniques for making aircraft engines and frames and much of shipbuilding had gone over to welded structures.

Oil was no doubt going to be extremely plentiful in the future. "If it is more economical and cleaner to use, you can't blame people for wanting to use it. It faces the coal industry with the problem not only of competition but of contraction," he said. He did not believe that the militant demands of certain leaders in the coal-mining industry were being supported by some of the rank and file. "Some who are conscious of modern changes are welcoming the chance to go to other industries," Mr. Osborn declared.

Sheffield was selling steel to wider markets and he foresaw that in the next decade the special article might become more costly and the standard article cheaper. He also had a word on take-over bids. Bigger production units meant more economical production and there must also be larger markets, he said.

Edgar Allen Feels Effects of Recession

RECESSION in trade which developed during 1958 has continued to affect adversely, though in varying degrees, the constituent companies of the Edgar Allen & Company, Limited, Sheffield, group of steelmakers and engineers, report the directors. The unaudited accounts for the half-year to September 30, 1959, show a reduction in group turnover and net profits compared with the half-year to September 30, 1958.

Last August it was forecast that, although there were signs of improvement in demand, it was unlikely that this would develop sufficiently early to benefit the current year's trading results very materially; and this has proved to be correct. Though turnover of the parent company for the last quarter of 1959 was greater than that of the same period in 1958—a trend which is expected to continue—estimates show that group profits for the year to April 2 will be smaller than those of the previous financial year.

The directors state that the recession has been most severe in those sections of group activities which relate to production and supply of capital goods and components. Every possible effort is being made to attract business in this direction and there are now indications that schemes of investment in new plant and equipment, curtailed or postponed for various reasons in the past two years, are being revived and prospects of oversea orders are now favourable.

The interim dividend is unchanged at 4 per cent. for the year ending April 2. In 1958-59, a second interim of 8½ per cent. made a total of 12½ per cent.

AEI Steel Mill Equipment for Australia

ELECTRICAL equipment for Australian rolling mills worth nearly £700,000 has been ordered from the heavy plant division, Rugby, of Associated Electrical Industries, Limited, by Australian Electrical Industries Pty., Limited, the company's Australian subsidiary.

The largest order is for drives for a new 5-stand tandem cold strip mill which will roll wide strip at a maximum speed of 5,000 ft. a minute. Motors with a total output of 20,750 h.p. will drive the mill and its tension reel, and the generators supplying direct current to the motors will be driven by two 10,000-h.p., 750-r.p.m., synchronous motors.

Stand 1 will be driven by a single-unit 2,000-h.p. motor; stands 2, 3, and 4 each by a double-unit 4,000-h.p. motor; stand 5 by a triple-unit 5,500-h.p. motor; and the tension reel by a triple-unit 1,250-h.p. motor. Most of the control equipment for this mill will be manufactured in Australia to suit the control scheme designed by heavy plant division engineers, but "Magnestats" (magnetic amplifiers), the supervisory control panel, high-speed circuit-breakers, and rheostats are being supplied from Britain.

Of the other two orders, one is for a 1,000-h.p., direct current motor for driving an additional stand for an existing merchant mill and the other is for a 500-h.p., direct current motor with grid-controlled mercury-arc rectifier to drive an edger stand which is being added to an existing billet mill.

African Notes

Steel Industry Foresees Coking Coal Shortage

PROJECT to exploit the Waterberg coalfield, estimated to be the biggest in South Africa, is being entertained by the South African Iron & Steel Industrial Corporation, Limited, and other interested parties. Exploration by diamond drilling is to start shortly. The decision to exploit the Waterberg reserves has been stimulated by the concern felt by South Africa's steel industry at the prospect of the exhaustion of domestic supplies of coking coal.

The new coalfield is about 40 miles long and 20 miles wide. The seam is found 60 ft. below the surface and preliminary drilling has shown it to be between 200 ft. and 420 ft. thick. Two shafts were sunk by the Department of Mines in 1946. It is estimated that there are reserves of 11,000,000,000 tons of bituminous coal and 6,000,0000,000 tons of coking coal.

The first holes to be sunk by Iscor will be in the 200-ft.-thick section of the seam, but later boreholes will be sunk to a depth of over 400 ft. The drilling sectors have been named the Bull, the Cow, and the Calf.

The £2,690,000 scheme to make Port Elizabeth the Union's main ore-handling port will be completed by 1962. The first £500,000 has already been spent. The equipment being laid down will enable the port to load 700 tons of manganese an hour and have storage for 200,000 tons.

New wharves, 600 yds. long, are being planned at Lourenço Marques, Mozambique.

Mr. W. E. Geerling, who has succeeded Sir John M. Duncanson as chairman of the Rhodesian Iron & Steel Company, Limited, took up his new appointment on January 1. Mr. D. W. R. Haysom, a member of the board, has taken over as managing director from Mr. Geerling.

Sir John asked to be relieved of the Risco chairmanship because of his "very heavy responsibilities and commitments in the UK." In addition to wide industrial and commercial interests he is vice-chairman and a member of the council of the Iron and Steel Institute, the first president of the Institution of Nuclear Engineers, and a director of the National Research Development Corporation. The board of Risco has accepted the nomination from the Lancashire Steel Corporation, Limited (of which Sir John is a director), of Mr. R. P. Gaunt, a fellow member of the board, to succeed him.

After some years as managing director of the South African Steel Sales Company, Limited, Mr. Geerling joined Risco early in 1959 as managing director.

SIR ARTHUR ELTON has been appointed by Associated Electrical Industries, Limited, to be the controller of its central information department. He will take up his duties on March 1. For the last three years he has been in charge of films and television in the public relations division of the Shell Petroleum Company, Limited. Mr. S. C. Leslie, who was appointed a year ago as AEI's consultant on information policy, has been acting for the past six months as the head of the central information department during the process of its establishment. After Sir Arthur's arrival he will be free to resume his consultancy duties.

Europe Will Use and Stock More Coal

COAL consumption in the European Coal and Steel Community during the current quarter is expected to increase by 3.4 per cent.—probably for the first time since 1957 and the beginning of the coal crisis. The demand is likely to come from the domestic and iron and steel sectors, demand elsewhere still being on the decline. The reduction in working days in the mines will mean a 1,500,000-ton decrease in production (900,000 tons in Belgium and 600,000 tons in West Germany), but stocks are not likely to show a relevant drop; in fact, a record surplus of 33,000,000 tons is expected by the end of June.

West German coal output last year dropped by almost 7,000,000 tons to 125,590,000 tons and there was an even bigger drop in coke production to 34,725,000 (39,580,000) tons. Brown coal output remained level at just under 93,500,000 tons. There was less discrepancy, however, in the December figures, compared with the previous month. Hard coal output was 10,990,000 (10,600,000) tons; coke, 8,530,000 (8,340,000) tons, and brown coal, 2,940,000 (2,830,000) tons.

Brodsworth Pit Will be Even More Productive

DEVELOPMENTS at Yorkshire's largest colliery—Brodsworth Main, near Doncaster—are planned to increase output to 1,680,000 tons a year by 1965. Largest output so far was achieved in 1957 when 1,437,000 tons were won. Coal-face power loading recently introduced has built up output to the limit of the capacity of the steam-winding engines, the North-Eastern Divisional Coal Board reports, and new electrically-driven winding engines of 2,700 h.p. are to be installed in two shafts.

The deepening of the No. 3 shaft at the pit has enabled it to carry the full output of 4,000 tons a day from the Barnsley and Dunsil seams and the output from the Parkgate and Thorncliffe seams is due to be wound from a new pit bottom in connection with which the Nos. 1 and 2 shafts have been deepened.

Coal from all three shafts is now carried by belt conveyors to screening plant capable of dealing with 1,200 tons an hour, although the average output will be about 700 tons. The pithead baths have been extended to accommodate 4,000 men—the number required to give a production of about 2,000,000 tons of coal a year.

DUTCH STEELMAKERS' EXPANSION

FOR the year to November 1959, considerable increases in output in the majority of departments is reported by the Dutch steel concern, Koninklijke Nederlandse Hoogovens en Staalfabrieken. Comparative figures are as follow:—

Coke, 630,000 (591,000) tons; pig-iron, 1,120,000 (887,000) tons; ingot steel, 1,356,000 (1,085,000) tons; thick plate, 329,000 (300,000) tons; tubes, 25,400 (16,000) tons; cold- and hot-rolled thin plate, 405,400 (341,800) tons; galvanized plate, 132,300 (88.500) tons; nitrogen, 101,400 (101,000) tons; cement, 600,300 (413,000) tons.

Rise in iron and steel output was about 20 per cent. over the year, due to the bringing into operation of a new blast furnace.

Economy Measures Affect Scotland's "Show" Colliery

ECONOMY measures which will affect manpower and coal-getting at the Scottish Divisional Coal Board's £14,000,000 "showpiece" pit, Rothes Colliery, Thornton (Fife), were revealed by Mr. John McArthur, NUM secretary for Fife and Clackmannan, speaking at a meeting of Kirkcaldy Trades Council.

Development of the lower seams would not now go on and coal would be mined only in the upper seams, the coal from which had a more ready market and was more economical, he said. The colliery had been planned to mine coal from both levels with an ultimate production of 5,000 tons a day. Manpower, originally to have been 2,500, was now cut to 1,200.

Mr. McArthur also said that the NCB thought the future of Seafield Colliery, Kirkcaldy, was all right—but it could not be guaranteed. The only future for West Fife miners was at Comrie, Blairhall, and Valleyfield. Randolph Colliery had opened a new seam and a mechanized unit had been installed. It had a remarkable record for output per manshift, but despite this it was scheduled for closure.

In a statement, the East Fife Area headquarters of the Coal Board says that it has been decided to concentrate on developing the 266-fathom level at Rothes and bring it up to its scheduled output. In the light of information gained, further consideration will be given to developing the deeper levels. The manpower employed will be in accordance with this programme.

Regarding Randolph Colliery, a NCB spokesman said that its main workable seams were exhausted. Some time ago a pumping scheme was planned which involved a drivage to the so far unworked Letham Well Seam. It was decided that if the seam proved at all favourable an attempt would be made to work it by mechanized methods. The development had proved reasonably successful with good o.m.s. figures. The quality of the seam, however, was not high and the board had put the colliery on a "care-and-maintenance" basis for 1960.

FARMERS CRITICAL OF COAL BOARD POLICY

CRITICISMS of the National Coal Board's estates policy in Northumberland appear in the annual report of the county branch of the National Farmers' Union. The report is particularly critical of the board's decision to give up farming in the Ashington area and let all its farms there to a company controlled by an American and the subsequent purchase of the Woodhorn agricultural estate.

To acquire this estate, which consists of 1,270 acres, the Coal Board outbid a Morpeth farmer and a Midland trust at a Newcastle-upon-Tyne auction a few months ago and paid £103,000. It is suggested by the NFU that the board's intention in buying the land was to ensure that damage done by mining did not have to be repaired.

The report states that a deputation was sent to the Northern (N & C) Divisional Coal Board about its decision to let the Ashington farms to Northumbria Farms, Limited. It is felt that local farmers should have had the opportunity of competing by public tender for the tenancy of the farms. The union hopes that local farmers will have a chance of renting or buying farms in future sales.

Inquest on Brodsworth Mine Car Driver

RECORDING a verdict of Accidental Death, the Doncaster District coroner, Mr. W. H. Carlile, last Friday, said that it was a question of whether mine cars involved in a fatal accident at Brodsworth Colliery, near Doncaster, were properly coupled or not. He did not think they could have been or they would not have run away.

The inquest was held into the death of Mr. H. Shaw (43), who died from multiple injuries after being struck by five runaway mine cars. The coroner said that the deputy, Mr. William Robson, had given instructions about coupling the cars and this was one of the simplest jobs that Mr. William Slater, the haulage hand on duty at the underground junction, had to do. It was pretty obvious they were not properly coupled.

Mr. Slater said he was controlling traffic at the junction because, although he was a haulage hand, he had requested light work. "I started the job on Monday and I was never told how to do the job; I just picked it up," he declared. After allowing a locomotive pulling 14 empty cars and a locomotive driven by Mr. Shaw to pass in one direction, he coupled extra loaded cars to another train. He checked the coupling and was satisfied it was properly fastened.

Later he heard a sound and hurried to the junction to see what it was. He tripped and lost his lamp and then saw a red light coming back towards him. He tried to apply the brake, but was unable to do so because of the cars' speed.

Mr. Norman Gray, driver of the other diesel locomotive, said he felt a bump and found the runaway cars had hit Mr. Shaw's locomotive. He was not in it or under the wreckage. "He may have jumped for it," he said.

Accident-free Durham Miner Can Go "Oop for t'Cup"

A DURHAM mineworker who remains accident free will qualify for one of the 2,200 prizes offered this year by the Durham Divisional Coal Board as part of the Greater Safety Campaign launched by the board some time ago. Speakers for the campaign—among them Dr. William Reid, chairman of the Division, Mr. Sam Watson, general secretary of the Durham Area of the NUM, and Durham Area general managers—have frequently stressed that with the co-operation of all, a substantial reduction in accidents can be achieved in 1960.

Each quarter 550 prizes will be drawn, those eligible being colliery underofficials and workers who are compensable (free from an accident involving absence from work for a period exceeding three days) in the period January 1 to April 2. Some idea of the growing safety-consciousness in the Division can be gained from the fact that last year the number of fatal accidents was 17, the lowest number ever recorded, compared with 46 in 1958 and 39 in 1957. The total strength of the Division is 95,000.

Each of the 50 main prizes, worth more than £30, represents a weekend for two in London with all expenses paid, including a sightseeing tour and two theatre tickets—and it will take place on F.A. Cup Final weekend (May 6-8). In addition, there will be 500 consolation prizes of £1 premium bonds.

NEWS IN BRIEF

IT IS REPORTED that equipment for steel rolling mills is now being produced in the Whanghai ironworks, North Korea.

THE Cable Makers' Association announces that Crompton Parkinson, Limited, Guiseley (Yorks), has rejoined the CMA.

ORDERS for ingot steel plate and machinery worth over £110,000 have been placed with German firms by the Indian Government.

PREMISES of Cockerham, Spencer & Nesbit, Limited, Pudsey, near Leeds, are being transferred to Sterling Mills, Chapeltown, Pudsey.

ONE OF THE OLDEST engineering firms in Dunfermline (Fife), Michael Tod & Son, Limited, is to close down at the end of next month.

THE JAPANESE GOVERNMENT is understood to be effecting the liberalization of pig-iron and steel-scrap trading with other countries.

DURING 1959 the sum of £1,172 was contributed to charities by employees at the works of Bairds & Scottish Steel, Limited, Glasgow.

THE Duke of Edinburgh will visit the headquarters and laboratories of the Tin Research Institute at Greenford (Middx) on March 16.

THE ADDRESS of Powell Duffryn Technical Services, Limited, is now Boundary House, 7/17, Jewry Street, London, E.C.3 (telephone: ROYal 0141).

A NEW FRENCH FRANC, minted in pure nickel, came into official use on January 1 and was in circulation for the first time last week.

THE FEDERAL GERMAN Cartel Bureau has turned down a bid by West Germany's 10 leading iron and steel producers to set up a rebate cartel for tubes.

A NEW DRY DOCK capable of accommodating the largest vessels is planned by Smith's Dock Company, Limited, at South Bank, near Middlesbrough. It will be 135 ft. wide, 1,000 ft. long, and able to take vessels of up to 100,000 tons.

PRELIMINARY OFFICIAL FIGURES show that in 1959 some 60,000,000 metric tons of raw steel was produced in the Soviet Union. Over the same year there was an output of 43,000,000 tons of pig-iron and 47,000,000 tons of rolled-steel products.

TWO SUBSIDIARIES of the West German steel concern Rheinische Stahlwerke are to raise their capitals—Rheinstahl Hanomag, AG, by DM 15,000,000 (£1,250,000) and Rheinstahl Union Brückenbau, AG, by DM 3,000,000 (£250,000).

A LARGE installation of industrial fluorescent lighting by Philips Electrical, Limited, London, W.C.2, has been carried out at the Kirkstall, Leeds, factory of the British Screw Company, Limited. The new scheme replaces one using cold-cathode lighting.

PLANS ARE UNDER WAY in Formosa by which annual steel output will be raised from its present level of 240,000 short tons by a further 200,000 short tons. An American group is stated to be financing and planning the steel expansion project for the country.

SOME $3,500,000 is to be spent by the Armco Steel Corporation, of the United States, in doubling its research installations. New laboratories will include facilities for nuclear research in relation to steel and will be in use from the beginning of 1961.

A SECOND FACTORY at Tolworth, Surbiton (Surrey), has been acquired by Nash & Thompson, Limited, engineers, within 200 yds. of its present research and production unit. The new factory is of 35,000 sq. ft. The transfer of administrative departments, research and development, and some production departments has now been completed.

AN IMMEDIATE start is to be made by Ferranti, Limited, electrical and general engineers, on the building of a new research, manufacturing, and development unit next to its Crewe Toll, Edinburgh, premises. Cost of the new building will be in the region of £120,000.

ABOUT 200 PENSIONERS in Wolverhampton have applied for jobs offered by the Villiers Engineering Company, Limited, which is suffering from a labour shortage. In order to obviate deductions from old-age pensions, the company is offering a special 25-hour five-day week.

AFTER SUSPENDING work in 1958, Stewarts and Lloyds, Limited, is to continue the construction of its £150,000 three-storey students' building near its Corby works. The building will provide living and study accommodation for about 60 students and there will be a resident warden and other staff.

STRIKE OF LUXEMBOURG mineworkers and iron and steel workers, threatened since last August, has been averted by an arbitrated increase of one Luxembourg franc (about 1¼d.) per hour on all pay rates from January 1. Compensation for the second half of 1959 has also been allowed.

THE NEW CUMNOCK (Ayrshire) Group of collieries won the Sir John Erskine Savings Trophy for 1959 of the Scottish Savings Movement, which is competed for by collieries throughout the Scottish Division. The Group was originally runner-up to Andershaw Colliery (Lanarkshire), which closed down recently.

WESTOOL, LIMITED, the St. Helens, Auckland (Co. Durham), electrical engineering firm, is to manufacture domestic electrical equipment for the first time. It has acquired the manufacturing rights of the "Coltswold" fan heater from New Day Electric, Limited, Chalford, near Stroud (Glos), which is now in voluntary liquidation.

MERGER OF THE power cable business of Enfield Cables, Limited, Enfield (Middx), and Standard Telephones & Cables, Limited, London, W.C.2, has resulted in the formation of a new company, Enfield-Standard Power Cables, Limited. It has an initial capital of £1,000,000 in 500,000 "A" £1 shares and 500,000 "B" £1 shares.

FOR THE FIRST TIME in the history of the National Industrial Fuel Efficiency Service the closing stages of 1959 brought bookings of paid services above £20,000 in a month. The value of regular service agreements is nearing the £80,000-a-year mark. More than 760 firms and organizations now employ NIFES on regular service work.

WITHIN THE NEXT few weeks Rockweld, Limited, manufacturers of welding plant and accessories, etc., of Croydon (Surrey), will be moving to a new factory at Frimley, near Camberley (Surrey). The complete move is likely to occupy the next year or two. The company's subsidiary, Dymet Alloys, Limited, will also be moving to Frimley.

FURTHER INCREASE in industrial orders in November —over a third more than in November, 1958—is reported by the West German Economics Ministry. The overall index is 199 (1954=100). Export orders increased by 39 per cent. and home orders by 34 per cent., the steel industry showing a rise in orders of no less than 81 per cent.

RECORD OUTPUT OF 6,776 tons of steel ingots was produced in the week ended January 2 by the Saltburn

(Yorks) melting shops of the Skinningrove Iron Company, Limited. This is the result of the conversion of one large and two smaller furnaces to liquid fuel firing using a mixture of creosote and pitch. A fourth furnace is being converted to this system.

FOLLOWING A SURVEY of the potential market for the manufacture of cast-iron pipes in Australia, Stanton Pipes of Australia Pty. has been registered in Melbourne with a nominal capital of £A5,000,000. The parent company in the UK, the Stanton Ironworks Company, Limited, near Nottingham, is a subsidiary of Stewarts and Lloyds, Limited.

DURING 1959 not a single fatal accident occurred at the nine collieries in the No. 3 (South-East Durham) Area of the Durham Divisional Coal Board, although the number of small accidents was still high. This was the first year since 1949 that the Area had been free from fatalities. There was also a reduction in the number of serious mining accidents.

A TOTAL of 105,965 tons of coal was shipped through Garston Docks, Liverpool, during December, of which 80,205 tons went to Northern Ireland, 23,588 tons to Eire, 2,124 tons to the Isle of Man, and 48 tons to other coastwise destinations. The month's coke shipments totalled 785 tons, which included 598 tons to foreign destinations and 187 tons to Northern Ireland.

THE BRITISH TRANSPORT COMMISSION is spending about £500,000 on building two large new coal hoists at Immingham Docks, Grimsby. The first hoist should be in operation by the beginning of February, with the second operating by about April. The new hoists can be operated at about twice the speed of the old equipment so that the colliers will spend considerably less time at the loading wharf.

THE FIRST SMOKELESS FUEL to be made by the NCB for open fires is now on sale in north-east Derbyshire. According to a spokesman for the East Midlands Divisional Coal Board, the fuel is clean and leaves very little ash. It is made from selected local coal by plants at Grassmoor and Hardwick, near Chesterfield. It is selling at 9s. 9d. per cwt. in Chesterfield, but the price elsewhere is expected to vary.

DUE TO THE DECLINE in the demand for bolts and railway fastenings, the Cwmbran (Mon) works of Guest Keen & Nettlefolds (Midlands), Limited, employing some 380, is to close down. It is hoped that many of the workers will be absorbed by a new malleable-iron foundry the company is to open at Cwmbran to make motor-car parts. It is expected to be in full production by the end of the year.

SAFETY SLOGAN CONTEST with prizes amounting to £100, including a first prize of £25, is being organized for mineworkers by the Northern (N&C) Divisional Coal Board. The winning slogan will be used in flashing lights at pitheads and other working places. Although the overall accident rate in the Division remains fairly stationary, accidents associated with stumbling, falling, slipping, handling supplies, use of tools and appliances, and falling objects are on the increase.

TRANSFER OF THE MACHINERY of Samuel Marsden & Son, Limited, manufacturers of nuts and bolts, of Manchester, to new premises at Ashton-under-Lyne will commence in a few months' time and should be completed in about 18 months. The company has had to vacate its Manchester works to allow for the expansion of the Manchester College of Science and Technology, but has acquired the old works at Ashton-under-Lyne of the National Gas & Oil Engine Company, Limited.

THE TRACTOR DIVISION of the David Brown Corporation, Limited, Huddersfield, and the Oliver Corporation, of Chicago, has signed a purchasing agreement whereby the US concern will buy David Brown tractors and market them in the States, Canada, and South America, in addition to its own range of tractors. This is believed to be the first time a major US manufacturer has approached a British company with the object of buying British-made tractors for distribution in the States.

BIRMINGHAM ENGINEERING CENTRE announces that the following companies have become permanent exhibitors at its premises in New Street:—N. Hingley & Sons (Netherton), Limited, steelmakers, etc., of Dudley (Worcs); London Fan & Motor Company, Limited; Dargue Bros., Limited, manufacturers of drawing office furniture, etc., of Halifax; Armstrong Patents Company, Limited, Beverley (Yorks); British Ermeto Corporation, Limited, and Simplex Couplings, Limited, Maidenhead (Berks).

Engineers to Press Claims at Workshop Level

MEETINGS of the shop stewards associated with the 48 district committees of the Confederation of Shipbuilding and Engineering Unions are to be held throughout the country to forward the rank-and-file campaign in support of the confederation's demands for higher wages and a 40-hour week. This was decided at the monthly meeting of the confederation's executive held in York on Thursday of last week.

The campaign is designed to impress upon the employers at workshop level the strength of the desire of individual unions and their members to negotiate a more favourable reply than that so far given by the Engineering and Allied Employers' National Federation.

At a meeting of the London District committee of the confederation on Sundary various forms of action—such as one-day strikes, overtime bans, and one-hour strikes at key factories—were discussed, the intention being that such action should take place before January 26 when the confederation will again meet the employers. The fact that the confederation had asked committees not to take unconstitutional action was stressed by the president, Mr. Frank Foulkes, who said: "We don't want them to violate the agreement. I think that isolated action would do more harm than good."

Ore Chartering

MARKETS have been rather quiet of late and are best described as being in the process of settling down, although charterers do not appear to be pressing. The Mediterranean market is dull, with only a small volume of business effected, including Almeria/Ymuiden or Amsterdam at 25s. 6d. for 4,400 tons, second half January, and a contract has been arranged from La Goulette, Almeria, or Benisaf/Rijeka or Trieste at 24s. for the first loading port or 26s. for the second or third, to commence in March.

As far as West Africa is concerned, some business has been arranged from Konakri to Gdynia, Gdansk, or Szczecin at 35s., f.i.o., and trimmed basis 10,000 tons, December/January. Two January vessels of about 15,000 tons have been fixed.

The pyrites trade from Huelva to this side is quiet, but a 3,000-tonner for January has been fixed to Dublin at 44s. and, for forward loading, 7,800 tons to Antwerp at 26s. 6d.

Phosphate reports 9,500 tons for middle January from Casablanca to Immingham at 28s. 6d.

Company Statement

JOHN SUMMERS & SONS, LIMITED

Results Exceed Expectations

CONTINUOUS HEAVY DEMAND

Full Order-Book

MR. RICHARD F. SUMMERS ON THE OUTLOOK

THE annual general meeting of John Summers & Sons, Limited, will be held on February 4 at the Iron and Steel Institute, 4, Grosvenor Gardens, London, S.W.

The following is the statement of the chairman, MR. RICHARD F. SUMMERS, circulated with the report and accounts:—

Before embarking on this statement I refreshed my memory with what I had said at this time last year. I found that under "Future Prospects" I forecast that there would not be any significant increase in our production and deliveries, but that demand would be such that it would enable us to dispose of everything we could make. I also predicted that the financial results would be somewhat similar. In the event it seems that my forecasts were reasonably accurate. If anything the financial results are somewhat better than had been expected. Deliveries of sheets were up by some 40,000 tons, and the demand was very heavy throughout the year.

Dividend

I do not propose to go into details with regard to the Balance Sheet and Profit and Loss Account, as these, and any changes we have made in their presentation, are explained in the Directors' Report. You may recollect that in June when we capitalized some of our Reserves, giving Shareholders one new Ordinary Share for every two held, it was made clear that these new Shares would rank for the final Ordinary Dividend paid early in 1960, and that if the same total amount were paid as in the previous year the final dividend would be at the rate of 6¾ per cent. on the enlarged Capital. It was further indicated that we hoped that when the time came it might be possible to justify some modest increase on this rate. I am glad that we do in fact find ourselves in a position to fulfil this forecast and to recommend a final dividend of 8½ per cent.

I have said on a number of previous occasions that our objective is to develop the Company and increase its efficiency whenever we can, and at the same time endeavour to give a fair return to our Shareholders. Taking everything into consideration I believe that our achievements last year can be said to have lived up to this aspiration.

Progress of Development Scheme

Unfortunately, owing to a number of circumstances, we have been delayed in the completion of our development scheme. We did, however, bring into operation the two new down coilers on the hot strip mill in April, and shortly after the end of the financial year we brought into commission the two-high reversing mill and the new re-heating furnaces. These were two steps in the overall plan for increasing production from the hot mill, and we have already felt the first benefits of their operation.

At the time of writing this statement our Engineers are engaged on the last, and perhaps the most complicated, of the major changes on the hot mill—that is, installing at the end of the finishing train the two original roughing mills. The preparation of the foundations for these was very ingeniously carried out without interruption to production. This completes the main alterations to the hot strip mill, but we shall not be able to take full advantage of them until the modifications to the slabbing mill have been completed, and the new finishing Departments are ready.

Progressively during the year further sections will be brought into production, and we are hopeful that towards the close of the current financial year all the major units will be in operation, with the exception of the new cold reduction mill, which was one of the additional items referred to in the Directors' Report, and which was only ordered some 12 months ago. So far as steelmaking capacity is concerned we have all that is required, and the output of ingots can be progressively stepped up as and when the mills are in a position to roll increased quantities.

While it is regretted that we have not completed this scheme by our original target date, it has been by far the most complicated that we have ever embarked upon, as it entailed drastic modifications to existing units, and great ingenuity has been required to keep down to the minimum the interruption to the current production. Much credit is due to all those concerned for the way in which they tackled, and are tackling, this difficult and intricate manoeuvre.

Future Demand for Flat Rolled Products

Demand for sheet and strip has been, and still is, very heavy, and the difficulties of some of the sheet consumers have been aggravated by the American steel strike. The fact that British mills have been unable to meet the demand is fully realized, and has been due to a combination of delays in the completion of new equipment, and a number of technical difficulties. The Industry, however, has not been idle or complacent about this matter, and a great deal of time has been spent in trying to assess the likely future demand, in the first instance up to 1965.

In order to arrive at this figure a vast mass of statistics had to be collected, and consultations held

with the main consuming industries. The increased production shortly coming from our plant at Shotton and the improvement expected from the other two strip mills should ease the position in the near future. As things look at the moment the Industry has plans to ensure that by 1965 the capacity to produce sheet and strip may be somewhat in excess of the estimated demands.

It is not easy to foresee five years ahead, but there is every indication that the demand for flat rolled products will continue in an upward direction, as it is now widely recognized that as the standard of living increases, so does the demand for durable consumer goods, but I feel that we should not overlook the fact that there are now other substances, notably plastics, which can in some cases be used as substitutes for sheet steel. They have made great strides recently, and already some of the smaller household utensils which had been made of steel—usually enamelled—are now being replaced by similar articles made of plastic. This I think should act as a spur to us as producers of steel sheets to improve our products, and to keep costs as low as possible.

Company's Future Prospects

I have already said that we hope 1960 will see the completion of our present expansion scheme. We do not expect to see much in the way of increased production during the first half of the year, as we shall be busily engaged in transferring and modifying much of our finishing equipment, but we would hope that in the latter half we should begin to reap the benefit of these changes and be able to increase our deliveries, and that by the end of the year the capacity at Shotton would be approaching its target.

Our order-book is full, and we are anxiously awaiting the time when with increased production we shall be able to meet more nearly the requirements of our customers. We appreciate that during the past year we have been unable to do this, but we tried to avoid misleading our many friends by making delivery promises which we knew we could not possibly have implemented. From the financial point of view we would hope that when we get the larger production we should benefit not only from the increased tonnage, but also from the fact that with all the Departments working at or near their capacity, economies in production costs would result.

On a previous occasion I indicated that at the moment we have no further large-scale schemes in mind, but we shall naturally be keeping in close touch with the situation, and will have due regard for any changes in conditions. Preliminary experience indicates that it may well be the case that the capacities of some sections of the plant which we installed may prove to be in excess of our original estimates. In this event we should give careful consideration as to what steps we could, or should, take to bring up the output in other units to match them. Whenever possible we like to base our plans and estimates of production on our own practical experience. Though this method may take a little longer, sometimes it avoids making what could be costly mistakes, and in the long run we believe produces the best results. Whatever may be the future capacity of the British sheet industry, we are satisfied that owing to its long experience and the comparatively low cost of its modern equipment, this Company will be in a strongly competitive position.

Nationalization

We were all naturally greatly relieved at the results of the General Election. And in this connection I should like to say how much we have valued the support of our Shareholders, most of whom stuck to us even when the outlook did not look too bright. Three times the electors have rejected nationalization; I trust that it has now been made clear that the doctrine has lost its appeal, and that the majority of voters want no more of it.

I hope that the few remaining Companies still in State ownership will soon be returned to private enterprise, and that ways and means will be found for disposing of the prior charges in all Steel Companies.

Subsidiary Companies

In spite of very difficult trading conditions during most of the last financial year the results at Shelton Iron & Steel, Limited, were a record. This reflects great credit on the management. Their order position is now greatly improved; we hope that this state of affairs will continue, and that they will be fully employed throughout the year.

At our various Brick Works the demand was not very good in the early part of the year, but there has been a marked improvement in the latter months, with the result that profits were a little better than in the previous year. Now I can report that they are very busy in all Departments, and here again I would hope that this will be reflected in their earnings.

Tribute to Employees

We have had the usual keen and loyal support from all our employees during the past year, and I take pleasure in expressing on behalf of all those who have an interest in the Company our warmest thanks and appreciation.

In conclusion I feel entitled to say that progress has been made in the year under review, and while we have a number of complicated technical problems ahead of us, we are now well within sight of the achievement of our goal of a substantial increase in production. I am hopeful that in a year's time when I come to make my statement I shall be able to report that the strength of the Company's position and its prestige have advanced still further.

CHEMICAL PLANT MANUFACTURERS TO COLLABORATE

FUTURE collaboration in the design and construction of Chemico catalytic carbon monoxide removal plants has been agreed by Chemical Construction (Gt. Britain), Limited, and Whessoe, Limited, designers and builders of plant for the oil, atomic power, gas, and chemical industries, of Darlington.

Chemico-Whessoe plants may be designed for low- or high-pressure working with or without subsequent removal of carbon monoxide. Most of the organic sulphur compounds are converted to hydrogen sulphide and subsequently removed, thus providing town gas of reduced toxicity and low sulphur content.

PLANS TO ERECT an iron and steel plant on the Dutch island of Rozenburg, which have been under consideration by a study group, are now reported to be far enough advanced for them to be laid before the Dutch Government. Criticisms that the project was uneconomic have been countered by the group, which has stated that American experience has shown that plants of between 300,000 and 400,000 tons capacity are capable of economic operation.

Prof. Whetton to Lecture in Canada and the USA

LECTURES at a number of universities in Canada and the United States are to be given by Prof. J. T. Whetton at the invitation of the Nuffield Foundation and the British Council. He sailed from Liverpool last Friday and the tour will extend until the end of March.

PROF. J. T. WHETTON

Educated at the universities of Leeds and Durham, he became Professor of Mining at Leeds in 1945 and was Pro-Vice-Chancellor of that university from 1955 to 1957. Prof. Whetton, who is 65, gained a first-class colliery manager's certificate and had practical experience in the Yorkshire, Northumberland, and Durham coalfields. He had further experience in Germany, France, Belgium, and Poland, and also visited oilfields in the Middle East and Venezuela. He has written extensively on mining topics, including papers read before the National Association of Colliery Managers.

Prof. Whetton served with gallantry in both world wars. In the 1914-18 campaign he was awarded the Military Cross, and in the last war he received the DSO and was made OBE. He also received Russian and Belgian awards. At the end of the last war he served for a time as technical mining adviser to the Ruhr.

Victor Products' Expansion Plan

PLAN to counter the falling off of orders from the National Coal Board has been introduced by Victor Products, Limited, Wallsend, which intends to introduce a new product every six months for the next five years. The firm's managing director, Mr. R. W. Mann, gave details of the scheme and introduced the first new product to a gathering of industrialists in Newcastle-upon-Tyne on Wednesday of last week.

The new product is a miniature fluorescent lighting fitting which embodies much of the company's experience in producing safety lighting for the oil, coal-mining, and other dangerous industries. It is claimed to be weatherproof and dustproof, with long-life fluorescent tubes providing about the same illumination as a 60-watt filament bulb with only a 26-watt rating. Orders for 400 fittings were taken at last week's meeting.

AGREEMENT GIVING John Harper & Company, Limited, Willenhall (Staffs), the sole selling right and option to manufacture in the UK the 2½-cub. ft. refrigerator of Hermann Forster, Arbon, Switzerland, has been reached. The refrigerator will be marketed under the name "Harper."

Law Cases

WELSH FIRM FINED £100

WELSH firm of agricultural engineers and sheet-metal workers, Steel Fabricators (Cardiff), Limited, was fined £100 by Cardiff Stipendiary Magistrate, Mr. Guy Sixsmith, for failing to fence securely dangerous machinery. Prosecuting, Mr. R. J. Atkins, said a Mr. Price was operating a brake press which was capable of exerting a pressure of 240 tons. He had 1,000 steel strips to bend at each end and completed 800 when the metal slipped and Mr. Price's hand was jerked into the machine so that he lost his right index finger.

"Anyone doing this job is working in considerable danger, but if a satisfactory guard had been provided this accident would not have occurred," said Mr. Evans.

Mr. Michael Evans, who appeared for the company, said that since 1955 the firm had spent a considerable amount of money investigating the possibility of designing a guard which could be used for more than one type of job in the factory.

"I do not think I can blame Mr. Price for this unfortunate accident," said Mr. Sixsmith. "It would take a very strong-willed person to insist on a guard being provided. The company must be fined the maximum for the offence."

CHIEF CASHIER ROBBED PETTY CASH

DEFICIT that was brought to light when the Area cashier and the financial accountant of West Fife Area, Scottish Divisional Coal Board, visited Nellie Colliery, Lochgelly (Fife), figured in a case heard at Dunfermline Sheriff Court when the former chief clerk at the colliery, David Cairns (52), pleaded Guilty to embezzling £55 3s. 7d., between July 1 and December 3, 1959. He was sent to prison for 60 days.

The fiscal stated that Cairns lost £25 of his own money in July, obtained a loan from his sister, but could not pay her back and took some money from the office. He then took smaller sums to gamble with to try and make up the shortage. It was more a matter of taking money out of the petty cash rather than making false entries in the books, he said.

For Cairns it was said that he had been at the colliery all his working life. If given a chance he would repay the money. Sheriff R. R. Kydd said the defendant had taken a substantial sum while in a position of trust and he could do no other than impose a prison sentence.

FERNIE GREIG, colliery belt attendant, was fined £15 or 60 days' imprisonment at Kirkcaldy Sheriff Court, when he admitted a charge of sleeping below ground at Lochhead Colliery, Coaltown of Wemyss. The fiscal said that the colliery manager, who found Greig asleep beside a conveyor belt, had pointed out that it was essential for the accused to remain alert so that he could stop the belt at any time in case an accident occurred.

CZECHOSLOVAKIA's industrial production plan for 1959 has been exceeded by 2 per cent. and represents an 11 per cent. increase on 1958. Plans for 1960 envisage outputs of 6,800,000 metric tons of steel, and 4,500,000 tons of rolled steel products, and increases of 4.4 and 6.5 per cent. in the outputs of hard coal, and brown coal, respectively.

Obituary

MR. R. P. ALLCOCK

NORTHERN regional explosives sales manager of Imperial Chemical Industries, Limited, Mr. R. P. Allcock, died on January 1 at the age of 57. He had had an extensive career in mining and quarrying.

After attending Nottingham University, Mr. Allcock began his mining career in the Derbyshire coalfield. In 1927 he joined the Demerara Bauxite Company, Limited, in British Guiana, and joined the technical service department of ICI's Nobel division in 1933. Later transferring to the northern region, he became regional explosives sales manager in 1953.

A member of the Institution of Mining Engineers and the National Association of Colliery Managers, Mr. Allcock was also an associate of the Institute of Quarrying.

Mr. JOSEPH KIRKHAM, joint managing director of J. & W. Kirkham, Limited, pump makers, non-ferrous founders, etc., of Bolton, died on Saturday.

A former chairman of Chubb & Sons' Lock & Safe Company, Limited, London, W.1, Mr. HARRY EMORY CHUBB, died last Friday at the age of 79. He was made CBE in 1945.

The death occurred on Monday of Mr. T. A. SHIMMIN, general manager of Cardox (Great Britain), Limited, manufacturers of safety coal-blasting equipment, of London, E.C.2.

The death took place on Saturday of Mr. HOLMAN CALLANDER KIRK, secretary accountant to John C. Carlson, Limited, brewing and chemical trades engineers, of Ashton-under-Lyne. He was 46.

The death is announced of Mr. PETER WOOD MURRAY, a divisional director of K. S. Paul (Molybdenum Disulphide), Limited, London, N.W.10, following injuries received in a car accident.

Manager of the Dublin branch of Baxendale & Company, Limited, lead manufacturers, plumbers' and builders' merchants, etc., of Manchester, for many years, Mr. HERBERT GARDNER died on Saturday. He had served the company for over 40 years.

The death occurred on Tuesday of last week at the age of 71 of Mr. ALBERT BROOKES, who was secretary of Todd Bros., Limited, the St. Helens (Lancs) manufacturers of steel drums, chains, structural steelwork, etc., for many years before his retirement through ill-health in 1946.

The death has taken place of Mr. JAMES S. SMITH, works manager of John Marshall & Company (Motherwell), Limited, boilermakers, of Motherwell. He started work with the firm on leaving school and served in various departments until his appointment as works manager some nine years ago.

A director of Barton & Sons, Limited, manufacturers of forgings, pressings, springs, edge tools, etc., of Dudley (Worcs), and several of its subsidiary companies, Mr. ALFRED H. REDFERN, has died. He was also a director of Redfern, Stevens, Limited, dropforgers, etc., of Birmingham, and its associated company, E. & H. P. Smith, Limited.

The death has occurred of Mr. WILLIAM HENRY RUSSON, formerly chief clerk and cashier at Thoresby Colliery (Notts). He began his association with the industry in 1914, when he entered the offices of Creswell Colliery (Derbyshire). When Thoresby Colliery was opened in 1925 he left his position as assistant chief clerk at Creswell, to take over as chief clerk at Thoresby.

Mr. IVAN BARDIN, who has died in the USSR at the age of 76, was an eminent metallurgist. After studying at Kiev before the first world war he spent a year with a Chicago metal plant. After the second world war he directed the production of ferrous metals in eastern Russia and played a large part in the restoration of war-damaged plant in once-occupied territories. He was vice-president of the Soviet Academy of Sciences.

New Director for Geological Survey and Museum

NEW director of the Geological Survey of Great Britain and Museum of Practical Geology in succession to Sir William Pugh, FRS, will be Dr. C. J. Stubblefield, FRS. Sir William is due to retire on July 28.

Dr. Stubblefield, who is 58, has been with the Geological Survey and Museum since 1928. He was chief palaeontologist for six years until 1953, when he became assistant director in charge of special services and Northern Ireland. He received the degree of D.Sc. of London University in 1943, was elected a Fellow of the Royal Society in 1944, and is president of the Geological Society of London. He is also a vice-president of the Palaeontographical Society and a member of the council of the British Association.

Sir William Pugh graduated at the University College of Wales, Aberystwyth, and after service in the first world war, was appointed Professor of Geology at Aberystwyth. In 1931 he was appointed to the Chair of Geology in the University of Manchester and in 1943 he also became Deputy Vice-Chancellor of that university. Sir William, who became director of the Geological Survey and Museum in 1950, was knighted in 1956.

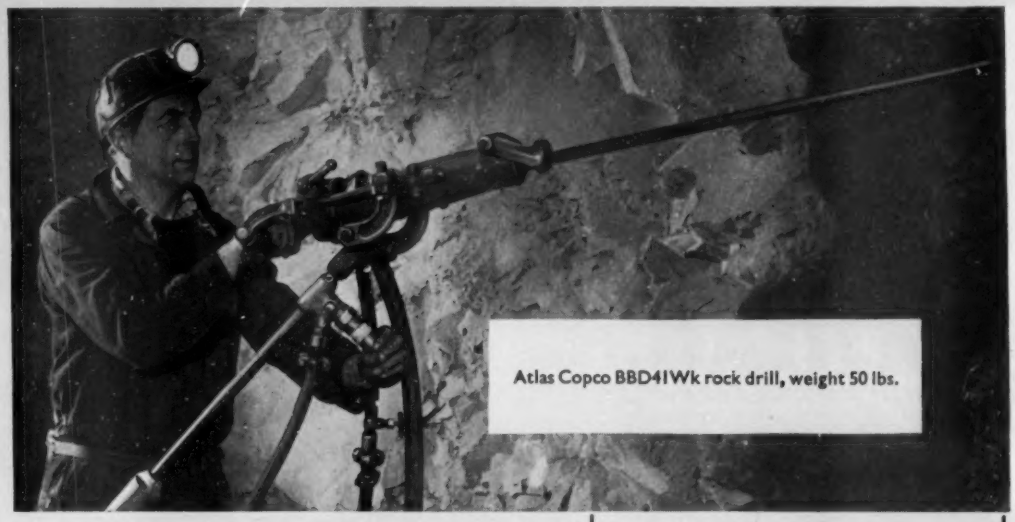
EMI Makes Counterbid for Lancashire Dynamo

LATEST offer for Lancashire Dynamo Holdings, Limited, has been made by Electric & Musical Industries, Limited. The EMI counterbid for the ordinary and preference capital of Lancashire Dynamo is £11,600,000, and its acceptance is recommended by the Lancashire Dynamo directors, who are to issue a circular to stockholders shortly.

The previous bid came from Metal Industries, Limited, on Christmas Eve and was made without prior consultation with the Lancashire Dynamo board. It was worth some 65s. 9d. per ordinary unit.

The terms of the EMI bid are 150 EMI ordinary shares for every £100 stock in Lancashire Dynamo, and 42 EMI ordinary for every £100 of Lancashire Dynamo preference stock.

A statement from Metal Industries yesterday (Thursday) said that an amalgamation between MI and Lancashire Dynamo would bring "considerable benefits" to shareholders of both companies. It recommended Lancashire Dynamo shareholders to take no action on the EMI bid and promised a further statement soon.



Fastest drill of all .... the Atlas Copco BBD41Wk

FASTEST lightweight drill in use today (25" a minute in hard granite!), the Atlas Copco BBD41Wk rock drill consumes *less* air than do many slower drills, and costs far less in maintenance. For drifting and benching the BBD41Wk is supreme today – in footage per shift and in footage per £ gross working costs. Here is exceptional drilling speed without the smallest sacrifice of the traditional Atlas Copco characteristics – rugged strength, ease of handling, low air consumption and minimal maintenance demands.

For full details or to arrange a demonstration write to Head Office or contact your nearest Atlas Copco sales and service depot.

THE ASSOCIATED TUNNELLING COMPANY USING ATLAS COPCO BBD41Wk ROCK DRILLS SET UP ANOTHER RECORD

During the seven days ending August 30th, 1959, at the Agecroft Colliery near Manchester, an advance of 105 yards 6 inches was made in only 21 shifts. The Associated Tunnelling Company, who were the Contractors, used face crews consisting of a team of nine men per shift. Drilling was carried out with Atlas Copco BBD41Wk Rock Drills mounted on pneumatic pusher legs. Eight machines were used for drilling the round. A drilling platform was used to drill the top holes simultaneously with the lower ones, two machines operating from the platform and six from the floor of the tunnel. The area of excavation was approximately 24½ sq. yards.

Atlas Copco

COMPRESSED AIR ENGINEERS

ATLAS COPCO (GREAT BRITAIN) LTD

Maylands Avenue · Hemel Hempstead · Herts

Telephone: Boxmoor 6040/5

Sales and Service Depots at LONDON · BRISTOL · CARDIFF · MANCHESTER WALSALL · LEEDS · GLASGOW · BELFAST · DUBLIN

D5128

Company News

Increased Orders for Aveling-Barford

WELCOME increase in the number of orders placed, both home and oversea, in the last quarter of the year to September 30, 1959, and the first quarter of the current year, is reported by Mr. Edward Barford, chairman of Aveling-Barford, Limited, power-driven plant manufacturers, of Newcastle-upon-Tyne. Reorganization of group production was largely completed in 1958-59 and the trade investment in British Standard Machinery of Australia, Limited, has been sold and a new wholly-owned subsidiary formed to be responsible for manufacturing arrangements there.

Though group turnover in 1958-59 was higher, trading profit declined to £487,970 (£541,999). Mainly due to tax rate reduction the profit balance available rose to £243,247 (£216,237) and the dividend is held at 12½ per cent. Year-end group fixed assets expanded to £1,251,814 (£1,179,538) with outstanding commitments of £66,000.

DUCTILE STEELS, LIMITED—The directors propose a one-for-one scrip issue.

G. & R. THOMAS, LIMITED, refined pig-iron manufacturers, etc., of Bloxwich (Staffs)—The Staveley Coal & Iron Company, Limited, has acquired all the company's capital.

BARTON & SONS, LIMITED, manufacturers of forgings, springs, pressings, edge tools, etc., of Dudley (Worcs)—The company has sold its subsidiary, West Midland Refining Company, Limited, Bilston (Staffs).

GARRARD ENGINEERING & MANUFACTURING COMPANY, LIMITED—So far as the board is aware, there is no foundation for the rumours suggesting that there will be a take-over bid for the company's share capital.

ROTARY HOES, LIMITED—Allotment of the 13,746 shares left from the company's recent ordinary issue, to applicants for 828,963 excess shares, has been by ballot. Successful applicants have been allotted either 20 shares or, where application was for less than 20, full allotment.

WORSLEY MESNES IRONWORKS, LIMITED—The chairman, Mr. W. D. Gibbs, says that orders, particularly on the heavier side of the business, are again below the desirable level and without a marked improvement over the next few months capacity cannot be fully employed.

ARMSTRONG, STEVENS & SON, LIMITED, dropforgers and machinists, of Birmingham—The offer for the company's capital by the Heenan Group, Limited, has been accepted by holders representing over 90 per cent. of the shares and has become unconditional. It remains open until February 2.

WILLIAM DOXFORD & SONS, LIMITED, engineers and shipbuilders, of Sunderland—As far as the directors are aware, any suggestions or rumours of a take-over bid which may be circulating and which may be unduly affecting the present market price of the ordinary stock are without foundation.

FLETCHER, HOUSTON & COMPANY, LIMITED, ironfounders and engineers, of Tipton (Staffs)—A two-for-one scrip issue is proposed. The company is paying a dividend of 80 (70) per cent. for the year ended September 30, 1959. Group net profit, after tax of £80,189 (£80,323), is £88,128 (£74,452).

RICHARD LLOYD, LIMITED, machine-tool makers, engineers, etc., of Birmingham—Over 92 per cent. of holders have accepted the offer by the British Rollmakers Corporation, Limited, for the issued preference capital. The offer is now unconditional. Late acceptances will be included in the terms of the offer provided they are not received later than January 31.

MILES DRUCE & COMPANY, LIMITED, iron and steel stockholders, of London, W.3—A one-for-two scrip issue to holders of January 20 is announced. The new shares will rank for the 1959 final dividend, which, following a "considerable improvement in trade since June," the directors expect will not be less than 8 per cent. Allotment letters will be despatched on January 27 and will be renounceable until February 26.

LEY'S FOUNDRIES & ENGINEERING, LIMITED—Dividend is being raised by the equivalent of 2 per cent. to 7½ per cent. with a 4 per cent. final for the year ended September 30, 1959. During the year there was a one-for-one scrip issue, before which a first interim of 3 per cent. was paid on £550,000. The second interim of 2 per cent. and final now announced are on £1,100,000. Net profits for 1958-59 are £384,383 (303,502).

PULSOMETER ENGINEERING COMPANY, LIMITED—Legal proceedings referred to in the 1958 directors' report as then pending against the company in connection with negotiations for the acquisition of the share capital of J. Caslake, Limited, manufacturers of art metal work, of Bournemouth, have been disposed of by agreement between the parties. The company has paid the sum of £27,500 and has no further obligation in the matter.

ACROW (ENGINEERS), LIMITED—The company's order-book is very large and all works are operating at full overtime capacity, state the directors. First quarterly dividend is being raised to 12½ (8¼) per cent. on capital increased by a one-for-seven scrip issue, for the year to March 31, 1960. Actual payments for the previous year on the smaller capital comprised three 10 per cent. quarterly dividends and a final of 12½ per cent., the total being 42½ per cent., equivalent to 37$\frac{3}{16}$ per cent. on the present capital.

WM. PARK & COMPANY FORGEMASTERS, LIMITED—The directors propose one-for-two scrip and rights issues, both on the basis of present holdings. The rights issue is to clear the group's indebtedness, finance further development, and provide additional working capital. It will be made at 4s. per 2s. share. The dividend for the year ended September 30, 1959, is being raised to 20 (17½) per cent. In the absence of unforeseen circumstances and assuming that last year's level of profits is maintained, the board intends to recommend a dividend in due course for the year ending September 30, 1960, of 15 per cent. on the doubled capital of £440,000 after the issues. Group trading profits expanded to £233,171 (£216,337), and after tax provision of £133,522 (£135,226) the net profit is £99,649 (£81,111).

DANIEL ADAMSON & COMPANY, LIMITED, makers of water-tube boilers, steam turbines, etc., of Dukinfield (Ches)—In common with many others in the heavy engineering industry, the company experienced a difficult year in 1959 and the net profit, after tax, will be lower than for 1958, according to internal unaudited figures. The final dividend, however, will be maintained at 12 per cent. An unchanged interim of 3 per cent. has already been paid. Negotiations have begun for the purchase of the capital of a company with a good profit record engaged in the manufacture of products comparable with some of the company's. The directors state that they know of no particular reason for the recent rise in the price of the company's shares. For 1960 and future years the directors' statements will be half-yearly.

Muschamp AIDS ...to POWER LOADING

and Production of Large Coal

Muschamp Fishtail Chain on power loading machines. No pick changing for two-way cutting. Robust construction. Freedom from breakdown. Full use of production time. Large carbide area. Pick freely pivots.

Muschamp's Technical Underground Investigation Service is available at all times.

NJM

N. J. MUSCHAMP & COMPANY LIMITED

MANSFIELD WOODHOUSE NOTTS.

Tel: Mansfield 2344, 2345, 5722.

Orders Placed

£8,000,000 Order from China

ORDER valued at £8,000,000 for copper rods has been placed by the China National Metals Import Corporation with the UK consortium of cable companies which includes British Insulated Callender's Cables, Limited, Enfield Rolling Mills, Limited, Richard Johnson & Nephew, Limited, Pirelli-General Cable Works, Limited, and Frederick Smith & Company Wire Manufacturers, Limited. Delivery is expected to be completed this year.

The contract was probably arranged prior to the Government's recent general import liberalization measures under which Communist China has been transferred from the Relaxation Area to the Eastern Area (Communist countries). In the 11 months to November 30 last year, China bought £2,100,000 worth of copper wire from the UK and in the first 10 months of the year £1,400,000 worth of refined copper and copper bars, rods, angles, shapes, and sections, in addition to large purchases on the Continent.

A £400,000 ORDER from the Ahmedabad Electricity Company, India, for a 30Mm turbine generator and ancillary plant for the Sabarmati "C2" power station has been placed with A.E.I. Export, Limited. Another separate order is for 66kV switchgear for the station.

THE PAKISTAN GOVERNMENT has placed an order worth £350,000 for 88 Challenger diesel crawler tractors with John Fowler & Company (Leeds), Limited. They will be fitted with Marshall hydraulic Angledozers and will be used for land reclamation, road making, and irrigation work.

THE FIRST 275-kV switchgear installation in Scotland is to be provided for the South of Scotland Electricity Board by A. Reyrolle & Company, Limited, Hebburn (Co. Durham). The installation must be in commission by early 1962 to provide power for the new strip mill being built by Colvilles, Limited.

THE FIRST OF SIX hydro-electric generators, valued at several million dollars, to be built by the English Electric Company, Limited, for the Saskatchewan Power Corporation's Squaw Rapids development on the Saskatchewan River will be commissioned in late 1962. The whole project will be completed in 1964.

MOTOR VEHICLE manufacturers have placed contracts for 12,000,000 high-tensile bolts, nuts, and washers with New Marsh Bolt, Nut & Washer, Limited, Sheffield. Deliveries will be over 12 months. The company has also received a "rush" aircraft contract for £9,000-worth of bright bolts and set screws and nuts, to be completed by March 31.

NORTH LINDSEY WATER BOARD has awarded William Boby & Company, Limited, Rickmansworth (Herts), the contract for extensions to the existing Boby automatic base-exchange water-softening plant at the board's pumping station at Barrow-on-Humber. The contract is valued at £18,500. The extension will bring the plant's capacity up to 150,000 gallons per hour.

THE TURBINE GENERATOR DIVISION of Associated Electrical Industries, Limited, has received an order from the China Light & Power Company, Hongkong, for a 60 mW turbine generator, condensing plant, evaporating and feed water heating equipment for the Hok-Un power station. When completed, this power station will contain AEI plant of a total capacity of 290 mW. The order is worth over £500,000.

THE SCOTTISH DIVISION of the NCB has placed an order with Heyes & Company, Limited, Wigan, for a three-level Type 40 shaft signalling indicator system, for installation at Arniston Colliery (Midlothian). Similar equipment will be installed shortly at Parkside Colliery and Choppington "B" Colliery and is already in service at Agecroft, Pye Hill, Mosley Common, Askern, Kingsbury, and Preston Links collieries.

AN ORDER HAS BEEN received by the Power-Gas Corporation (Australasia) Pty., Limited, a member of the Power-Gas Corporation, Limited, group from Sulphide Corporation Pty., Limited, for the supply and erection of the charge-handling plant for a new smelter being erected at Cockle Creek, near Newcastle, NSW. The value of the order is about £A300,000 and the installation is to be completed by the end of 1960.

EVENTUALLY TO BE THE largest of its kind in the world, an oil gasification plant is to be installed at Osaka, Japan, by Humphries & Glasgow, Limited, London, S.W.1, in association with its Japanese licensees. Four units, each making 5,000,000 cub. ft. of town gas a year will be in operation by the end of the year. Total cost of the installation will be about £700,000. Eventual total capacity of the plant will be 30,000,000 cub. ft. of gas per day.

Welsh Miners Will Oppose Oil Competition

POLICY of aggression towards competition from oil is being adopted by miners in South Wales. Local authorities in the mining areas are being approached with a plea to be "loyal to coal" and all miners' lodges have been asked to make inquiries about oil consumption in their localities and to report to the headquarters of the South Wales Area of the NUM any projected changes from coal-burning to oil-burning plant so that every effort can be made to oppose them. There are a large number of miners among local government representatives in Glamorganshire and Monmouthshire, the two counties that contain half the population of Wales.

While coal production in South Wales last year was down by about 1,500,000 tons to about 20,000,000 tons, the consumption of oil by industries using more than 1,000 tons per annum was 1,020,000 tons, the largest on record and 125,000 tons up on 1958. Coal consumption by industry fell last year by an equivalent amount.

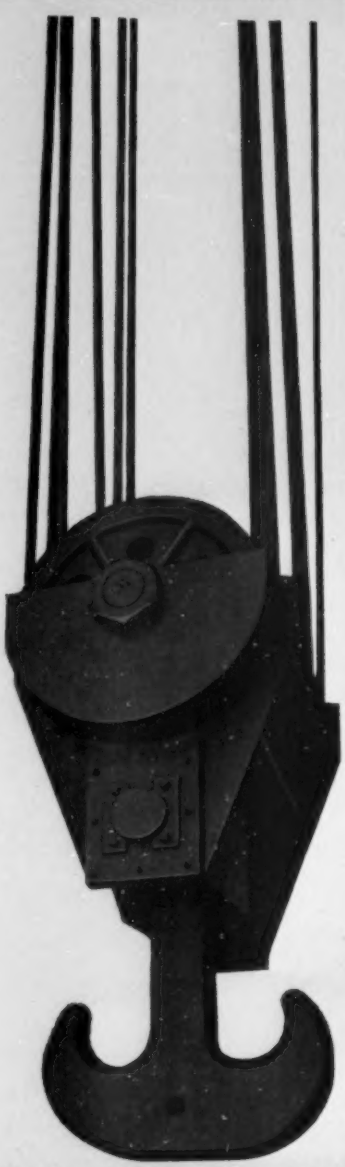
CONVENIENCE FACTOR IN USE OF OIL

SPEAKING at a refresher course for works managers and plant engineers at Leeds last week, Mr. E. F. Schumacher, economic adviser to the National Coal Board, said that it was not possible for a coal industry to prevent increasing encroachment of oil products on coal markets. It was not simply a matter of price competition. The convenience factor offered by a liquid fuel which could be pumped, and was, therefore, free of dust, was much more powerful, he said.

It was sometimes suggested that this country should invest in other sources of primary fuel and power rather than coal. The only source that could deliver the goods on the required scale would be oil and in the future there might also be atomic energy, said Mr. Schumacher.

The course was organized by the National Industrial Fuel Efficiency Service, the Leeds Productivity Association, and the Leeds Incorporated Chamber of Commerce.

TO LIFT THE LARGEST ALTERNATORS YET ENVISAGED



The hook of the 175 ton 'traveller' in our new turbine shop at Hartlepool. Here we can build, to Brown Boveri design, the largest turbo-alternators yet envisaged. At Hartlepool we, of course, also build small turbines, and many other things besides: industrial turbo-alternators down to 500 kW gas turbines, axial and centrifugal blowers and exhausters, water-tube boilers of Foster-Wheeler design, Economic type boilers, feed heaters, condensers, rotary cooling-water strainers, etc . . . in fact all the major equipment of a power station.

R W G

RICHARDSONS WESTGARTH (HARTLEPOOL) LTD.

A member of THE RICHARDSONS WESTGARTH GROUP which co-ordinates the land and marine activities of:

THE NORTH EASTERN MARINE ENGINEERING CO. LTD. — RICHARDSONS WESTGARTH (HARTLEPOOL) LTD.

PARSONS MARINE TURBINE CO. LTD. — THE HUMBER GRAVING DOCK & ENGINEERING CO. LTD.

GEORGE CLARK & NORTH EASTERN MARINE (SUNDERLAND) LTD. — RICHARDSONS WESTGARTH ATOMIC LTD.

ASSOCIATED COMPANY: ATOMIC POWER CONSTRUCTIONS LTD.

RICHARDSONS WESTGARTH (Hartlepool) LTD., HARTLEPOOL, CO. DURHAM

and at 58 Victoria Street, London, S.W.1. 59 Mosley Street, Manchester, 2. 75 Buchanan Street, Glasgow, C.1

Board Changes

New Chairman for Babcock & Wilcox

IN accordance with his earlier intimation to the board, Mr. W. Lionel Fraser, chairman of BABCOCK & WILCOX, LIMITED, engineers and boilermakers, etc., of London, N.W.1, is to retire from the board after the company's annual meeting on May 26. Sir Kenneth Hague, the deputy chairman, will take over the chairmanship and Sir Reginald Verdon Smith will become deputy chairman.

When Sir Lionel retires he will have served the company in the office of chairman for nearly 10 years. In acknowledgment of his services the board has decided to submit a resolution to the next annual meeting calling for his appointment to a new post, that of president. As well as holding the chairmanship of Helbert, Wagg & Company, Limited, investment bankers, of London, E.C.2, and Thomas Tilling, Limited, holding company for engineers, makers of glassware, etc., of London, W.1, Sir Lionel is on the boards of a number of other companies.

Sir Kenneth Hague, who is managing director as well as deputy chairman of Babcock & Wilcox, is chairman of Babcock & Wilcox of India (Private), Limited, and has seats on the boards of a number of other companies in the group. He is also a director of a number of other concerns. Sir Reginald Verdon Smith is chairman and joint managing director of the Bristol Aeroplane Company, Limited, is on the boards of its subsidiary and associated companies, and, he, too, is a director of other companies.

VENESTA, LIMITED—Mr. L. G. Rich has resigned from the board.

B. ELLIOTT & COMPANY, LIMITED—Mr. J. Trup has been appointed a director.

COPELAND & JENKINS, LIMITED—Mr. H. M. Robinson has been appointed a director.

ELCONTROL, LIMITED—Mr. B. A. Worswick has been appointed to the board as technical director.

MASSEY-FERGUSON HOLDINGS, LIMITED — Mr. H. A. R. Powell has been appointed a director.

SIMMS MOTOR UNITS, LIMITED—Mr. W. H. Longley has been appointed a director and chief accountant.

GEO. M. KING, LIMITED—Mr. Hartford M. King, sales director, has been appointed assistant managing director.

BIRMID INDUSTRIES, LIMITED—Mr. G. A. Rider, financial director, has been appointed deputy managing director.

BELLING & LEE, LIMITED—Mr. C. R. B. Townend, secretary, has been appointed to the board of executive directors.

NORTH BRITISH ELECTRIC WELDING COMPANY, LIMITED—Mr. Kenneth L. Wright has been appointed joint managing director.

SAM KAY RUBBER COMPANY, LIMITED—Mr. T. B. Knowles has been appointed a director of the company, a subsidiary of Sam Kay & Company, Limited.

DOWTY MARINE, LIMITED—Mr. Donald Campbell has been appointed managing director of the company, a newly-formed subsidiary of the Dowty Group, Limited.

W. S. ELECTRONICS, LIMITED—Mr. W. P. Rowley has been appointed assistant managing director of the company, a wholly-owned subsidiary of K.G. (Holdings), Limited.

FLETCHER, HOUSTON & COMPANY, LIMITED—Mr. Charles Stephens has resigned from the board. In April of last year he resigned the secretaryship to take up another appointment.

JACOBS MANUFACTURING COMPANY, LIMITED—Mr. G. C. Derbyshire has been appointed works and technical director of the company and its associate, Frank Guylee & Son, Limited.

CATERPILLAR TRACTOR COMPANY, LIMITED—Mr. James A. Folger, president and a director of J. A. Folger & Company, San Francisco, has been elected to the board to fill the vacancy created by the death of Mr. E. C. Lipman.

HUNTINGTON, HEBERLEIN & COMPANY, LIMITED—Mr. A. T. Rogers, technical director and chief engineer, and Mr. R. F. Jennings, technical director, have been appointed directors of the company, a subsidiary of Simon-Carves, Limited.

JOHN LYSAGHT, LIMITED—Mr. W. A. Nicol and Mr. W. W. Fea, both directors of the parent company, Guest Keen & Nettlefolds, Limited, have been appointed directors. Mr. Nicol will continue as secretary and Mr. Fea as chief accountant.

SETTLE, SPEAKMAN & COMPANY, LIMITED—Mr. W. H. Carroll has been elected chairman in succession to Sir Lynden Macassey, who has resigned from the chairmanship but remains on the board. Mr. J. A. Done has been elected an additional director.

GUEST KEEN & NETTLEFOLDS (SOUTH WALES), LIMITED—Mr. K. S. Peacock has relinquished his position as joint managing director, but remains chairman. Mr. N. R. R. Brooke, formerly a joint managing director, has been appointed sole managing director.

GUEST KEEN & NETTLEFOLDS, LIMITED—Mr. Douglas Bruce-Gardner, Mr. Stephen Lloyd, and Mr. Henry W. A. Waring have been appointed directors. All have been associated with the GKN group for many years and are directors of certain of its subsidiary companies.

ALLIED IRONFOUNDERS, LIMITED—Mr. W. H. Smith is to retire as chairman and from the board on March 31. The new chairman will be Mr. G. S. Stevens, vice-chairman and joint managing director, who will continue as joint managing director with Mr. H. C. Wilson Bennetts.

METROPOLITAN-CAMMELL CARRIAGE & WAGON COMPANY, LIMITED—Mr. D. J. C. Robertson, general manager, is to take over as managing director from February 1. He will replace Mr. H. N. Edwards, who, having reached the normal retirement age, will relinquish the appointment at the end of the month but will remain chairman of the board.

MCCALLS MACALLOY, LIMITED—Mr. A. E. Osborne, London office manager of the parent company, McCall & Company (Sheffield), Limited, has been appointed a director. He has been with McCalls for 24 years and is a member of the council of the Reinforced Concrete Association and the prestressed concrete development group of the Cement and Concrete Association.

GOODYEAR TYRE & RUBBER COMPANY (GT. BRITAIN), LIMITED—The chairman, Mr. A. S. Bishop, will retire at the end of the month, but will remain on the board. He joined the firm in 1916 and later became manager of the solid tyre department. He became head of the commercial tyre department and in 1933 was appointed general sales manager. He joined the board in 1936 as sales director.

METALLURGICAL EQUIPMENT EXPORT COMPANY, LIMITED—Mr. D. F. Campbell, formerly chairman, has been appointed president. The chairmanship will be held in rotation by the managing directors of the companies constituting the consortium. Mr. R. B. Potter has been appointed chairman for the next two years and Mr. P. Wrightson, deputy chairman, for the same period.